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HELMINTHIASIS.

KELLER (A. E.) & LEATHERS (W. S.). **The Incidence and Distribution of *Ascaris lumbricoides*, *Trichuris trichiura*, *Hymenolepis nana* and *Hymenolepis diminuta* in Thirty-Six Counties in Kentucky.**—*Amer. Jl. Hyg.* 1936. Mar. Vol. 23. No. 2. pp. 216–230. With 2 maps & 1 fig. [13 refs.]

Examination was of 0·005 gm. of faeces in decinormal caustic soda solution from 23,964 specimens. Ascaris incidence in the mean was 34·7 per cent. (16·6 to 40·8). Of positive cases 23·2 per cent. contained unfertile eggs only, 24·75 fertile eggs only, and 51·98 both. This infection was often familial. [Since their real infection rates will not be got by this method for trichuris and probably not for the two tapeworms, the figures need not be given.] *Clayton Lane.*

RAFAEL RÍSQUEZ (Jesús). Parasitismo por *Ascaris lumbricoides* verificado en Caracas (en 25,000 análisis). [**Prevalence of *A. lumbricoides* in Caracas.**]—*Gac. Méd. de Caracas.* 1935. Nov. 30. Vol. 42. No. 22. p. 347.

During the period 1932–35 the author has made at the Ministry of Health laboratory 25,000 examinations for Ascaris. Of the total, half were children, 20 per cent. men and 30 per cent. women. In 1933 and 1934 the percentage found infested was 46·0 and 44·8 respectively and in part of 1935, 45·3 per cent. [Unfortunately, the method of examination is not stated.] *H. H. S.*

ALICATA (Joseph E.). **Early Developmental Stages of Nematodes occurring in Swine.**—*U.S. Dept. of Agric. Washington. Technical Bull. No. 489.* 1935. Dec. 96 pp. With 30 figs. [143 refs.]

In this publication facts reported on the eggs of *Ascaris lumbricoides* from the pig are important for human medicine.

It was noted by RANSOM & FORSTER in 1920 that the embryo undergoes a moult while within the egg. Alicata's suggestion is that till that moult has taken place the larva does not become infective. In his experiments with guineapigs there were no lesions and no larvae in the lungs so long as the first moult had not taken place, that is up to 15 days' culturing at 33°C. At 16 days 10 per cent. of embryos were in the first moult and there were in the lungs 5 ascaris larvae

and several petechial haemorrhages; at 17 days 50 per cent. of embryos were in the first moult, 16 larvae were seen in the lungs, which were moderately congested; at 18 days 90 per cent. of embryos were in the first moult, 28 larvae were seen in the lungs, which had heavy congestion. About 4,000 eggs were fed to the guineapigs at a time. [The importance of the paper is that in the evidence for modes of transmission collected in this *Bulletin*, 1934, Vol. 31, p. 605, the eggs have, the reviewer thinks, always been described in the original papers merely as "embryonated," but even so they need not in the light of Alicata's work have been infective.] *C. L.*

DE BOER (E.). Experimentelle Untersuchungen ueber *Ascaris lumbricoides* des Menschen und des Schweines. [**Research on Ascaris of Man and Pigs.**]—*Ztschr. f. Infektionskr. d. Haustiere.* 1935. Vol. 48. No. 4. pp. 248–269. [41 refs.]

In experiments made on sucking pigs with ascaris eggs from pig and man, worms of full development have been grown from eggs coming from both sources, a fact speaking for the physiological identity of the two forms. Infection took place with difficulty on a diet poor in vitamin A.

Before the birth of the piglets search by a Kofoid and Barber technique using a saturated solution of common salt [s.g. 1,200] was made with a view to seeing that the mother's faeces contained no ascaris eggs. Even if they did not do so she was treated once, generally with oil of chenopodium, and if they did she was treated till the faeces were egg-free. At the same time care was taken to keep the pens free from this infection.

Feeding was by eggs which had been cultured for at least 2 months at 26°C. in 1 per cent. formalin solution; that they had in them embryos was seen through the microscope, and that they were infective was made sure by infection of guineapigs.

Each of a litter of 9 was given on one occasion 100 to 10,000 eggs of ascaris from the pig; there was no development of worms 2 months later. Each of a second litter of 5 was given on one occasion ascaris eggs from man; in two which had had 750 and in two which had had 10,000 eggs there was no development, in one which had had 750 there were 25 worms. In a third litter of 7 fed on more than one occasion with eggs of pig ascaris, the number of eggs given and of worms seen later were respectively 35,000 and 4; 450,000 and 22; 35,000 and 32; 530,000 and 31; 35,000 and 95; 30,000 and 1; and 35,000 and 105. In a fourth litter of 7 fed on more than one occasion with ascaris eggs from man the corresponding figures were 6,800 and 2; 7,300 and 0; 6,800 and 0; 7,300 and 2; 402,000 and 2; 285,000 and 1; and 7,300 and 1. As to poverty of vitamin A, 7 sucking pigs whose mother was taking food poor in this were each given 21,000 ascaris eggs from the pig with no development of worms, and 5 of another litter of a similarly treated sow were each given 37,000 eggs of ascaris from man with development of 1 worm among them all. As to controls, in 5 of one litter kept under the same careful conditions but not fed on ascaris eggs, there was no infection; but in 13 of another litter whose mother was left heavily infected and with whom they were left till they were 44 days old two were without worms, and the others had from 1 to 41 when 2 to 3 months old. *C. L.*

MAPLESTONE (P. A.) & MUKERJI (P. K.). **An Improved Technique for the Isolation of Ascaris Eggs from Soil.**—*Indian Jl. Med. Res.* 1936. Jan. Vol. 23. No. 3. pp. 667–672.

An attempt to determine the degree to which a modification of the Caldwells' technique for recovering ascaris eggs from soil was in fact successful.

The Caldwells' method [this *Bulletin*, 1928, Vol. 25, p. 959] consists in the thorough mixing of infected earth with an antiformin solution, the eggs being then floated in sugar solution of a high specific gravity. Maplestone and Mukerji made a suspension of faeces of the consistency of gruel, strained it through a fine wire sieve, shook the filtrate well, estimated its egg content by Stoll's method, and added 2 cc. of it to 10 cc. of earth. This culture was set aside for about 3 weeks. In the first experiments 10 cc. of 30 per cent. antiformin were added to the culture, there was frequent stirring, and then an addition of "25 cc. of saturated salt solution" [if of a solution of common salt the whole fluid would have a s.g. of about 1,143]; practically no eggs were recovered. It being judged that this was the effect of the low s.g. of the diluted fluid, the other preparations, after frequent stirring in the antiformin solution in which they remained from 3 to 24 hours, were allowed to stand, the fluid pipetted off, the soil removed to D.C.F. tubes, saturated salt solution added [presumed s.g. about 1,200], and the whole subjected to D.C.F.F. after which the percentage of eggs recovered varied from 0 to 25·1 [average 5·54]. When the cultures were broken up in D.C.F. tubes, the antiformin being in contact with them for 1 hour only, when they were centrifuged, when the fluid was pipetted off and replaced with saturated salt solution, and when the whole was subjected to D.C.F.F., the percentage of eggs recovered was between 0·17 to 33·2 [average 6·5]. When cultures were frequently stirred in water, chlorine gas was bubbled through the suspension for 10 minutes, the preparation centrifuged, the fluid pipetted off and "saturated salt solution" put in its place, no eggs were recovered in eight experiments. When the culture was mixed with 10 cc. of 2·13 per cent. caustic soda (its strength in antiformin), stood for half an hour, and chlorine gas was bubbled through it, the percentage of egg recovery was—from cultures which had remained moist throughout 16·9 to 51·1 [average 32], and from cultures which had dried before being put in the caustic soda solution 2·4 to 32·4 [average 15].

[It may be thought from the wording used in the paper that the reviewer has advised a saturated solution of common salt for the floating of ascaris eggs. He has not. On the contrary, the evidence he has offered [this *Bulletin*, 1926, Vol. 23, p. 261] is that the actual average collections of ascaris eggs from solutions of watery consistency having different specific gravities (and got by D.C.F.F. from the same quantities of a centrifugal precipitate of the same faecal suspension 30 to 61 days old) were as follows: 203 for s.g. 1,150, 2,400 for s.g. 1,200, 2,748 for s.g. 1,250, and 3,431 for s.g. 1,300, and were not bettered by higher specific gravities of the floating fluid. In addition it needs note that embryos do not develop in ascaris eggs kept for these periods under water, though they do so in earth, and that if hookworm work is a guide embryonated eggs will not commonly float in any solution however heavy. Then again, to moisten embryonated ascaris eggs which have dried is the surest way to cause hatching [this *Bulletin*, 1929, Vol. 26, p. 548] and the embryos do not float

unless it is by accident. It follows that the methods suggested above cannot be depended upon to show the real infectivity of a soil sample, and needs note that the authors do not say they can, though the ordinary reader may well draw from the wording the conclusion that they do.] *C. L.*

MEYER MAY (Jacques). Réflexions à propos de deux cas d'ascaridiose. [**Two Cases of Ascaris Infestation.**]—*Bull. Soc. Méd.-Chirurg. Indochine.* 1935. Sept. Vol. 13. No. 7. pp. 951–962. [25 refs.]

In the first case an ascaris escaped into the peritoneum through the necrotic wall of the gall bladder, in the second through a rent in the intestine caused by the host being run over by a car. *C. L.*

D'EMPAIRE (J. R. Hernandez). Obstrucción intestinal causada por ascarides.—Reprinted from *Rev. Soc. Méd.-Quirúrgica d. Zulia.* 1935. Sept. Vol. 9. No. 9. 8 pp. [26 refs.] French summary. Also in *Gac. Méd. de Caracas.* 1935. Dec. 31. Vol. 42. No. 24. pp. 369–373. [25 refs.]

CARBONELL Y SALAZAR (A.) & RODRÍGUEZ Y REMOS (C.). El diagnostico radiologico de la ascaridiasis intestinal y su importancia quirurgica. [**Radiological Diagnosis of Intestinal Ascariasis and its Surgical Importance.**]—*Vida Nueva.* 1936. Jan. 15. Vol. 37. No. 1. pp. 83–94. With 3 figs. [36 refs.]

The authors describe their technique as follows: An opaque [barium] meal is administered to the fasting patient and half an hour later the first radiograph is taken, the second in an hour and thereafter hourly till the head of the barium column reaches the caecum, and a final one when the whole has passed from the small intestine. The radiographs are taken with the patient lying on his back. The fluoroscope is used as a control for taking the radiographs at the best times. If the worms are numerous a single picture will usually suffice. The examination is valuable also where only males or unfecundated females are present and no eggs are found in the faeces. From the surgical point of view it is of value in preventing unnecessary operative procedure when a patient comes under observation for obscure abdominal symptoms.

The authors state that Taeniasis is similarly demonstrable.

H. H. S.

MAY (J. Meyer). Ascaridiose et radiologie.—*Bull. Soc. Path. Exot.* 1936. Feb. 12. Vol. 29. No. 2. pp. 141–145.

VASSILKOVA (Z.). [**Dehelminthization of Faeces containing the Ova of** *Ascaris lumbricoides.*]—*Med. Parasit. & Parasitic Dis.* Moscow. 1935. Vol. 4. No. 4. pp. 288–298. [In Russian.]

The author describes the results of experiments upon the action of various chemicals upon ascaris eggs. These were isolated from the uterus of the female worms into glass receptacles, covered with Barbagallo's fluid and incubated at 24°C. The effect of the chemicals was tested on unsegmented eggs, those in the stage of 4 blastomeres and on eggs containing a fully-developed embryo, both in pure culture and mixed with faeces. After subjecting the ova to the action of the

chemical in the incubator, they were centrifuged, washed in saline and again placed in the incubator. The effect of the treatment was judged by the subsequent appearance and viability of the eggs and embryos. The following proved to have no effect upon the eggs: " silver water " (water filtered through silver-bearing sand), chlorinated water (Cl content 28 to 450 mgm. per litre) and 50 per cent. creolin solution acting for 3½ hours. The development of the embryos was retarded by 5 per cent. creolin (5 hours), 4 per cent. carbolic acid (5 hours) 5 per cent. lysol (3½ hours), creosote 1 : 120 (5 hours), 10 per cent. caustic soda and 20 per cent. chloride of lime after prolonged exposure. Complete destruction of the eggs was effected by the following: 5 per cent. carbolic acid (5 hours), 10 per cent. lysol (5 hours), 2 per cent. cresole (3 hours), creosote 1 : 60 (5 hours), 2 per cent. mixture of sulphuric acid (1 gm.), cresole (1 gm.) and water (48 gm.) (5 hours), while quick lime and chlorinated water (650 mgm. Cl per litre) had a rapidly fatal action. *C. A. Hoare.*

Lande (P.) & Sigalas (R.). Ascaridiose et médecine légale. [**Ascaris Infestation and Forensic Medicine.**]—*Gaz. hebd. Sci. Méd. de Bordeaux.* 1936. Feb. 9. Vol. 57. No. 6. pp. 82–84.

A child of 5 died with convulsions, vomiting and diarrhoea, and poisoning was suspected. Autopsy showed a mass of 19 ascaris about 20 cm. above the ileo-caecal valve and no trace of poison. *C. L.*

Lamson (Paul D.) & Brown (Harold W.). **Methods of testing the Anthelmintic Properties of Ascaricides.**—*Amer. Jl. Hyg.* 1936. Jan. Vol. 23. No. 1. pp. 85–103. With 1 fig. [41 refs.]

A report on *in vitro* and *in vivo* tests against *A. lumbricoides* from the pig by hexylresorcinol, 6-hexyl-m-cresol, O-heptylphenol, santonin, carbon tetrachloride, tetrachlorethylene, chenopodium, and thymol.

The thoroughly washed worms were placed in normal saline in 400 cc. beakers, the fluid being held at a temperature of 37°C. and kept mixed by a power-driven glass propeller from which the worms were kept away by a gauze screen. The drug tested was added in quantity enough to form a 1 in 1,000 solution or suspension. Death was judged to have taken place if a worm did not show " definite motion in both directions " when dropped into water at 60°C. As to determination of stools negative for eggs, " the three methods most generally used for this are direct centrifugal flotation, which is the most accurate for a determination of absolute negativity, flotation [by which from the reference to the literature seems to be meant direct gravity floatation], and the dilution egg-count . . . we have come to the conclusion that the Stoll egg-count is of great practical value in determining the efficiency of drugs against ascaris, hookworm and whipworm. . . . We have been impressed by the value of a study of the percentage of negative cases after treatment as an index of anthelmintic efficiency."

" We are of the opinion that both *in vitro* and animal *in vivo* anthelmintic tests are of great aid in determining the probable action of a drug in man. *In vivo* anthelmintic tests in animals, as those on dog Ascaris, in testing a human ascaricide are simple and usually effective. The maintenance of large numbers of dogs is, however, very expensive. *In vitro* tests, on the other hand, are inexpensive and allow observation of the effect of drugs on

the worm which cannot be carried out *in vivo*. *In vitro* methods are of great value for orientation experiments especially where a large series of related compounds are to be studied.

"The final test of any anthelmintic is its action against that parasite in which one is interested in its normal host. For such a test in human ascariasis and hookworm disease the Stoll egg-counting method is our choice.

"The need for thorough study of the pharmacological action of new drugs before their use in man is emphasized. Ascariasis and hookworm disease are not usually fatal diseases, thus safety should be the primary requisite of any anthelmintic."

The Table shows the results obtained. [Those of santonin are of interest in confirming the findings of TAKAME & ASADA that it is not santonin which kills ascaris but some substance which the host's body makes from it. The authors do not mention this point but it is the really essential one in judging of the extent to which *in vitro* experiments are of any real value in grading anthelmintics. Nor in the consideration of the action of thymol in man do they make mention of the evidence suggesting that in its case too the body of the host alters it to something else, so that, if that is so, its action *in vitro* is no proof of its anthelmintic worth in man; nor for that purpose do they refer to the essential need of its proper particulation.]

C. L.

ROSSI (J. E.). La calciocianamide nella lotta contro le strongilosi. (Ricerche sperimentali.) [**Calcium Cyanamide in combating Ankylostomes.**]—*Arch. Ital. Sci. Med. Colon.* 1935. Oct. Vol. 16. No. 10. pp. 715–721.

The disinfectant and vermicidal action of calcium cyanamide has been proved in the laboratory but the author here reports experiments carried out by him on prepared plots of ground to imitate as nearly as he could natural conditions.

He took three small portions of land 4 by 6 metres, separated by netting. The grass was removed and the earth broken up a little. A culture of larvae of *A. caninum* was sprinkled on two of these; one was left thus, and on the other was distributed the cyanamide mixed with street dust in the quantity employed in agriculture, 960 gm. on the experimental area, equivalent to 4 quintals per hectare. On the third were placed the faeces of dogs passing *A. caninum* ova in quantity; the faeces had been collected for 6 days and kept in the cold to prevent development, then mixed with straw and left for 3 days in the open (temp. 24°C.) to develop; next this was mixed with 8 gm. cyanamide per kilogram of "manure," about the proportion used in agriculture. Two dogs, which repeated examination had shown to be free from ankylostomes, were then placed on each plot, and their faeces examined.

Those on the control plot were passing typical ova on the 38th and 41st days respectively, those on the second (where the cyanamide had been sprinkled directly on the ground) were passing ova in small numbers from the 45th day, those on the third (with the mixed faeces and cyanamide) were never found positive. On the 60th day an anthelmintic was given to all six, and the two on the control plot passed 68 and 92 hookworms, those of plot 2 none, one on plot 3 none, the other 7. A few days later, another examination revealed that those on the control plot were still passing ova, but none of the others.

The effect of various anthelmintics against pig Ascaris in vitro, *Ascaris in dogs, and Ascaris in man.*

	Hexyl-resorcinol	6-Hexyl-m-cresol	O.-heptyl-phenol	Santonin	Carbon tetrachloride	Tetra-chorethylene	Chenopodium	Thymol
Pig Ascaris *in vitro*	Killed 100% in 2′ Killed 90% in 1′ (1–1000 suspension in saline)	Killed 100% in 30′ Killed 90% in 20′ Killed 60% in 10′ Killed 40% in 5′ Killed 10% in 2′ Killed 10% in 1′ (1–1000 suspension in saline)	Killed 100% in 30′ Killed 90% in 20′ Killed 65% in 10′ Killed 10% in 2′ (1–1000 suspension in saline)	Killed 0% in 3 hrs. (1–1000 suspension in saline)	Killed 10% in 3 hrs. (1–1000 suspension in saline)	Killed 100% in 2 hrs. Killed 80% in 1½ hrs. Killed 10% in 1 hr. (1–1000 suspension in saline)	Killed 100% in 30′ Killed 85% in 20′ Killed 60% in 10′ Killed 70% in 5′ (1–1000 suspension in saline)	Killed 100% in 30′ Killed 90% in 20′ Killed 20% in 10′ Killed 10% in 2′ (1–1000 solution in saline)
Ascaris in dogs	0·050 gm./kg. removed 100% 0·025 gm./kg. removed 70%	0·200 gm./kg. removed 97% 0·100 gm./kg. removed 68%	0·2 cc./kg. removed 74% 0·1 cc./kg removed 46%	0·025 gm./kg. removed 23% 0·013 gm./kg. removed 25% 2 doses removed 70%	0·3 cc./kg. removed 100% 0·1 cc./kg. removed 68%	0·2 cc./kg. removed 100% 0·1 cc./kg. removed 94%	0·1 cc./kg. removed 100% 0·05 cc./kg. removed 71%	0·100 gm./kg. removed 100% 0·050 gm./kg. removed 88%
Ascaris in man	1·0 gm. removed 90% cured 70% 1·0 gm. removed 96% cured 72%	4·2 cc. removed 49% cured 5%	4·2 cc. removed 38% cured 9%	0·32 gm. removed 87·3% cured 80% 0·32 gm. cured 92% 0·32 gm. cured 20–66%	1·5–3·0 cc. removed 2·7% cured 9·4% 3·0 cc. cured 22·2%	3·0 cc. removed 35·6% 4·0 cc. removed 0% 3·0 cc. removed 0%	1 gtt. per yr. age cured 94% 1·5 cc. removed 69·8% cured 35·9% 1·5 cc. removed 83·2% 2·0 cc. removed 94·9%	3·0 gm. removed 20% 4·0 gm. cured 18·6% 6·0 gm. removed 32·7%
Toxicity to rats	0·35 gm./kg. killed 50%	2·3 cc./kg. killed 50%	2·8 cc./kg. killed 50%		1·9 cc./kg. killed 40% (3·04 gm.)	4·0 cc./kg. killed 40% (6·4 gm.)	0·08 cc. ascaridole killed 50% (Equivalent to 0·11 cc. chenopodium)	0·27 gm./kg. killed 50%

Calcium cyanamide would, therefore, appear a good disinfectant for infested land, but, as the author rightly points out, experiments such as these cannot quite imitate natural conditions, for there the distribution of the cyanamide is not likely to be uniform, nor would it all directly reach the soil, and thirdly the larvae would not be evenly distributed. *H. H. S.*

ERRATUM.—Vol. 33, No. 2, p. 111, in first line of summary of paper by STÉVENEL & BERNY on the destruction of hookworm eggs and larvae, *for* cyanide of calcium *read* cyanamide of calcium.

LEATHERS (W. S.) & KELLER (A. E.). **Investigations concerning Hookworm Disease in Southern States with Suggestions for Continued Control.**—*Southern Med. Jl.* 1936. Feb. Vol. 29. No. 2. pp. 172–177. [11 refs.]

The paper's title is the measure of its range. The hookworm is still a cause of danger and damage in these parts.

There are set out the facts which were collected by the Rockefeller Sanitary Commission in 1910 to 1914, which were based on faecal smears from 205,825 persons of which 41·8 per cent. were positive. Side by side with these are those of examinations made by the authors by the Stoll-Hausheer egg counting method using 0·005 gm. of faeces from 106,577 persons, of whom 14·1 per cent. were positive. A table converts egg counts into worm loads on a regular scale whatever the load [an action which HILL's work (this *Bulletin*, 1927, Vol. 24, p. 196) shows to be wrong], but fortunately in all other tables the counts themselves are given. "It is difficult to determine at what intensity of hookworm infestation clinical symptoms are likely to appear, but for practical purposes an infestation of 2,600 eggs per c.c. of feces, or approximately 100 hookworms, is found to be the level at which symptoms will probably occur." [RAMSAY's words on this problem (*ante*, p. 551) are "The work of such authorities as Stiles and Lane has amply proved that even the very lightest infections with hookworm have a deleterious effect on the individual." As to the egg-worm ratio, if the mean weight of the stool is taken as 100 gm. and the usual egg output for a single female Necator taken as 10,000 eggs, then 100 Necators half of them females will give 5,000 eggs per gram of stool. Perhaps the mean stool is taken as being of over 200 gm. but note is not made of this important point.] To the method of diagnosis used, South Carolina showed the highest percentage of infected persons and the largest egg counts; but with the low percentage of infected persons in Tennessee of 6·9 there were persons with high egg counts. It is shown in addition that hookworm infection is often a family problem [yet another pointer to dejectional infection] and that when one member is found infected the others should be examined. These are their suggestions for continued control:—

"Proper excreta disposal has not been observed uniformly. However, the Federal agencies have cooperated with state and local health organizations in field operations for building sanitary privies. The emphasis which is now being placed upon this phase of rural sanitation should greatly accentuate the value of proper excreta disposal."

In discussion it was pointed out by Dr. D. G. GILL that even now a number of rural schools are serving as disseminators of hookworms as well as of learning, and in closing Dr. KELLER said "After an analysis

of the data from counties with full-time health departments and counties without full-time health departments, we were not able to determine that there was any difference in the rate of decrease in the incidence of hookworm." *C. L.*

KELLER (A. E.), LEATHERS (W. S.) & JENSEN (M. H.). **An Investigation of Hookworm Infestation in Thirty-Six Counties of Kentucky.**—*Amer. Jl. Hyg.* 1936. Jan. Vol. 23. No. 1. pp. 33–45. With 3 maps.

"Continued reductions in the incidence and intensity of hookworm infestation can only be brought about by the application of sanitary measures which will be effective in permanently preventing the transmission of this parasite. It would seem since there is such a low general intensity level that treatment, except in areas of high incidence, would not be very effective in bringing about the desired results. Provision for proper excreta disposal and careful sanitary supervision and maintenance would seem to offer the most rational solution of the problem. This would be effective also in preventing the transmission of the other intestinal parasites.

"There are certain areas of high incidence of hookworm in Kentucky where on account of the economic status of the population it would be necessary to depend on treatment in great measure to improve the health of individuals residing there. Under these conditions treatment could be used as a stimulus to arouse interest in this problem and to obtain the cooperation of the people. It is likely that where this was done permanent measures could be eventually instituted.

"The studies should be extended, especially in the localities where the incidence of hookworm is highest. These relatively small areas at the present time are the ones most in need of systematic programs of control by the official health agencies. If control measures could be more uniformly carried out it would be possible to practically eradicate hookworm in Kentucky." *C. L.*

OTTO (G. F.). **Localized Centers of Hookworm Disease in Kentucky and North Carolina.**—*Amer. Jl. Hyg.* 1936. Jan. Vol. 23. No. 1. pp. 157–168. [15 refs.]

Over 6,000 persons were examined in the States noted in the title and the results are set out.

Examination was by Stoll's egg counting method and hookworm infection is still a problem. This is shown for example by comparing the 3 counties in which faeces were examined in 1914 by smear by the Rockefeller Foundation with the figures now got in these same counties, their respective percentages of infection being 83·1 and 48·4, 36·9 and 19·6, 56·8 and 33·3. The county percentage of incidence now varies from 0 among 78 persons examined (from 2 counties) to 54·7 among 872 and 58·3 among 824 in 2 other counties. The mining communities have less infection than the general, this varying from about 11 to 13 per cent. Women out of their teens are more often infected and have higher egg counts than men of the same age period. There are hookworm families. In Columbus County 27·3 per cent. of 815 rural whites showed infection to the method of examination used, against 12·3 per cent. of 716 negroes, while school children showed 34·4 per cent. as against 37·9 per cent. in 1914. Details of two heavily infected families are given, one of which had frequently moved to escape "persecution" by health and school authorities, and the other had thrown away the carbon tetrachloride given them. "A relatively small

percentage of the rural schools in these 7 counties have any privies at all and only a negligible few had approved sanitary privies."

C. L.

Scott (J. Allen). **Factors in the Epidemiology of Hookworm in Egypt.** [Abstract.]—*Jl. Parasitology.* 1935. Dec. Vol. 21. No. 6. p. 430.

"A study of the distribution of hookworm in Egypt has revealed the following facts: 1. As known for many years, the percentage incidence of infestation is generally high. 2. Certain districts, however, having a very low incidence have been discovered. Furthermore, high incidence villages have been found immediately adjoining low incidence villages. 3. Although Egypt has long been a classic center of hookworm disease, the intensity of infestation is very low. There is no evidence of any great reduction in recent years. As judged by the egg count, relatively few cases have a sufficiently large number of worms to place them in groups of probable clinical significance in the classifications given in the literature, even though due allowance is made for the species concerned, viz. *A. duodenale.* Since, however, this infestation is commonly superimposed on infestations of schistosomes and other parasites, the rôle of hookworm in the cumulative clinical effect is of undoubted importance. The situation is only partially explained by the hot, arid climate. Two further observations have thrown light on the problem. A study of the defaecation habits of the people has shown that soil pollution does not tend to be concentrated in places where intense soil infestation would result. Development of hookworm larvae is completely inhibited in cultures of soils from many common defecation areas. As the effect is independent of the sand or clay content of the soils, the factor involved appears to be of a newly recognized type in the natural control of hookworm. Under these conditions it seems obvious why intense human infestations are not built up, even though a high percentage incidence of low grade infestation is general."

Tubangui (Marcos A.), Basaca (Mariano), Pasco (Antonio M.) & Del Rosario (Fidel). **Observations on the Geographical Distribution of Hookworm Parasites and Hookworm Disease in the Philippines.**—*Philippine Jl. Sci.* 1935. Dec. Vol. 58. No. 4. pp. 447–477. With 7 figs. [21 refs.]

The results of a quantitative hookworm survey in the Philippines. The stools of 2,357 persons from different areas were examined by the Stoll-Hausheer method (0.005 gram), the figures being brought to a formed basis with allowance for size of stool. They have then a comparative value [though they cannot show the real position]. The incidence and the intensity, so judged, are highest in Cebu, Leyte, Cotabato and Camarines Sur, and in those places the mean haemoglobin percentage is lowest, especially in persons having egg counts of over 10,000 per cc. of faeces. Habits are the same all over the islands in defaecation and in going barefoot, and the difference in the weight of infection is put down to rain distribution and soil moisture, with a suitable temperature.

The hookworm is a problem in these islands, the contrary view being the result of examinations made in Manila where there is little of the infection [so that the position is as it was in 1923 (this *Bulletin*, Vol. 21, pp. 226–7)]. *C. L.*

LAMBERT (S. M.). **A Resurvey of Hookworm Disease in Fiji in 1935, Ten Years after Mass Treatment.**—*Jl. Trop. Med. & Hyg.* 1936. Jan. 15. Vol. 39. No. 2. pp. 19–21.

"Mass treatment of hookworm disease among primitive people is an effective means of bringing the disease under control.

"A resurvey of hookworm disease in Fiji in 1935, ten years after mass treatment, indicated that infection was only half of what it had been before the treatment campaign, and that infection was less severe in form. After ten years there were still few clinical manifestations of hookworm disease in areas where formerly there had been almost universal anaemia. The slow return of hookworm infection is attributed to a higher standard of soil sanitation introduced after 1922. Systematic treatment of hookworm cases by district medical officers and native medical practitioners under their direction would probably obviate the need of further mass treatments." *C. L.*

KELLER (A. E.), GOOGE (J. T.), COTTRELL (H. B.), MILLER (D. G.), Jr. & HARVEY (R. H.). **Clinical Study under Controlled Conditions of 1,083 Children with Hookworm.**—*Jl. Amer. Med. Assoc.* 1935. Nov. 23. Vol. 105. No. 21. pp. 1670–1675.

"This study shows that there is a correlation between the physical condition of children infested with hookworm and the worm burden. This relationship is not striking, however, until the intensity of infestation reaches a level of moderate to heavy infestation (100 or more hookworms)."

Faecal specimens were examined from 1,083 school children (or 59 per cent. of those of school age) by Stoll's method of dilution in caustic soda and by "the salt flotation method" [which of these with their varying worth being unstated]. The egg counts are taken as pointing in strict proportion to the worm loads and conclusions are stated in terms of worm loads; in spite of demonstrations by American workers themselves—HILL [this *Bulletin*, 1927, Vol. 24, p. 196] for human infections and SARLES [this *Bulletin*, 1930, Vol. 27, p. 423] for those of the dog—that as the number of worms harboured increases the egg output by each worm becomes less. Of the 1,083 specimens, 58 per cent. were positive to Stoll's method and 19·9 per cent. more to "salt flotation." The old knowledge is reaffirmed that there is some parallelism between the worm load and such symptoms as fatigue, weakness, dyspnoea and oedema. "There is rather marked variation in the light intensity groups and it is only when an infestation of 100 worms or more is reached that there is decided increase in the percentage of individuals complaining of these symptoms." A history of ground itch was rather commoner in those found positive at the time of examination than in those which were not. A table shows that the least amount of underweight was shown by those with "0 to 24 worms," that the nutritional condition was worst in those with "1,001 worms and over," that pallor was least in those with "101 to 500 worms,"

and diseased teeth and tonsils least in those with " 1001 worms and over." Red cells were highest in those with " 51 to 100 worms " namely 3,575,000 as against 3,445,000 in those with "no worms," though the haemoglobin fell steadily from 10·1 grams per cc. as the presumed worm load increased. Eosinophils were in the mean 9·6 per cent. among those in whom eggs were not seen. " With the increase in the intensity of infestation the diet became more inadequate in substance except vegetables " a presumed pointer to poverty and its attendant conditions. " Hookworm control now should be considered as part of a well balanced public health program. . . . Attention should not be focused on hookworm infestation alone."

C. L.

Peña Chavarría (A.) & Rotter (Werner). Untersuchungen ueber die Hakenwurmanämie. [**Studies on Hookworm Anaemia.**]—*Arch. f. Schiffs- u. Trop.-Hyg.* 1935. Dec. Vol. 39. No. 12. pp. 505–516. With 2 figs. [17 refs.]

In effect the paper is in two parts, a consideration of the cause of hookworm anaemia and a statement of the frequent discovery in this condition of venous thrombosis and embolism.

For the investigation of hookworm anaemia a group of 80 children has been chosen between 6 and 12 years of age. The conclusion is that lack of iron in the organism plays a decisive part in causing hookworm anaemia, for this anaemia is most marked in those cantons where the amount of flesh eaten is least, while the ordinary diet of these people has in it little iron-containing chlorophyl, and at autopsy the iron reaction in the organs (spleen, liver, kidneys, bone marrow, heart muscle and lymph nodes are mentioned) is completely absent, which is not the case in mere alimentary anaemia ; so to that extent the hookworm's blood sucking is allowed a share in the matter. The anaemia can be cured by iron without deworming, and deworming without iron does not cure it. In a typical reticulocyte curve after removal of 526 hookworms by carbon tetrachloride (the drug of the authors' choice) and the giving of Damesk's treatment with iron and ammonium citrate in 25 per cent. watery solution in doses of 6 to 8 gm. daily, the reticulocyte response after each of 3 courses of treatment was 20, 13 and 6 per cent. by which time the red cells had risen from 2 to 3·75 millions and the haemoglobin percentage from 15 to 65. There is no hint as to whether deworming was complete after treatment. As to the state of the bone marrow in the right femur, postmortem examination of 96 cases showed that erythropoiesis was complete in 41 cases, extended to half the bone or more in 35, and to less than half in 20. In the heaviest cases an aplastic marrow was common. It is held that very probably the small continued blood losses caused by the worms in their sucking and perhaps also hindrance to absorption caused by changes in the intestinal wall have an essential share in causing this iron-starvation anaemia.

Thrombosis and embolism were astonishingly common at autopsy. The former were seen in 59 of the 96 cases, while fatal emboli were present in 12, and minor ones in 34. Cases are cited to show the importance of these changes in causing death in hookworm anaemia.

C. L.

Cruz (W. O.). Sobre a significação da eosinophilia na ancylostomose. [**The Significance of Eosinophilia in Ankylostomiasis.**]—*Mem. Inst. Oswaldo Cruz.* 1936. Vol. 31. No. 1. pp. 1–10. [15 refs.]

The author has investigated the presence of eosinophilia and its degree in different stages of hookworm infestation. The eosinophilia found early is associated with migration of the larvae. Later it is due, he maintains, to heterologous albuminous substances secreted by the worms in the intestine and believes that withdrawal of eosinophile cells from the circulation to the local site leads by stimulation of the bone-marrow to stronger haemopoiesis, at least increase of leucocytes, and this stimulation continues as long as the helminthic secretion persists. Even though the anaemia is cured the eosinophilia may persist on account of these heterologous albumins. *H. H. S.*

Walters (A. H.) under the direction of G. Carmichael Low & P. H. Manson-Bahr. **Treatment of Ankylostomiasis in Indian Seamen.** —*Lancet.* 1936. Mar. 14. pp. 599–600.

A confirmation of the digestion of worms after an anthelmintic seeing they are not found in stools, though eggs are no longer present, a comparison of the value of D.C.F. with the smear, and of the worth of certain anthelmintics.

Of the 37 cases in question, and in whom infection was in fact displayed by D.C.F., the faecal smear was negative in 28; worms were recovered in 6 only. When seen again 5 to 12 months later eggs were present in 2 of 8 cases in which treatment had been by thymol, in 2 of 6 cases in which it had been by oil of chenopodium, in 2 of 6 cases by carbon tetrachloride and in none of 17 cases given a combined treatment of the two last consisting of 40 minims of carbon tetrachloride and 15 minims of oil of chenopodium of unstated ascaridole content, the drugs given separately in gelatin capsules. It is suggested that the infections were got in childhood, that the worms had become embedded in the wall of the small intestine and that the reappearance of eggs was due to relapse and not to fresh infections [see, however, this *Bulletin*, 1935, Vol. 32, p. 258]. No cases had been discharged as dewormed until the faeces had been free of eggs for at least 7 days after treatment. *C. L.*

Portuondo del Pino (A.) & Fermoselle Bacardí (J. J.). Contribución al tratamiento de los casos graves de ankylostomosis. [**Treatment of Severe Ankylostomiasis.**]—*Rev. Parasit., Clin. y Lab.* Habana. 1936. Jan.–Feb. Vol. 2. No. 1. pp. 99–103.

The author records the case of a woman admitted to hospital suffering from enteric fever a month after her confinement. When the temperature became normal she was noticed to be very anaemic, and examination of the stools revealed hookworm ova in large numbers, 10 or more per field [apparently by direct examination]. She was given 30 drops of oil of chenopodium in castor oil. A fortnight later there was no improvement; ova seemed to be just as numerous, haemoglobin was still 15 per cent. only and her general state was very poor. She was given a blood transfusion of 200 cc. and improved. Six days later she was given by duodenal sound 30 cc. Necatocida Kuba in castor oil (Necatocida Kuba has a basis of oil of chenopodium and CCl_4). A week later, ova were fewer, and a second dose of the Necatocida was given, and after 7 days examination showed one or

two ova in some fields, in others none. Later, a third dose was given, also by duodenal sound, and since then no ova have been seen. The author maintains that in very severe cases of hookworm infestation, the correct procedure is transfusion of blood and administration of the anthelmintic by duodenal tube. *H. H. S.*

CAMERON (G. R.) & KARUNARATNE (W. A. E.). **Carbon Tetrachloride Cirrhosis in Relation to Liver Regeneration.**—*Jl. Path. & Bact.* 1936. Jan. Vol. 42. No. 1. pp. 1–21. With 14 figs. (13, 3 coloured, on 5 plates) & 1 chart. [84 refs.]

" Our object in this paper is to describe experiments with carbon tetrachloride designed to throw some light on the relationship of repeated liver damage to the development of cirrhosis. Information on the pathology of acute and chronic carbon tetrachloride poisoning is also brought forward," and regeneration is studied.

The first object of the paper is not, the second and third are, of great direct interest to those who give hookworm treatments. This note is limited to the points of direct interest. The experiments were made on albino rats with an average weight of 150 grams, the drug being given hypodermically to nearly all of them. With a single dose the smallest amount causing histological change in the liver (the minimum toxic dose for rats) was 0·016 to 0·033 cc. per kgm. of body weight. Facts giving proof of regeneration were of three sorts. First directly histological, nuclei being giant, or mitotic, or there being more than one in a cell ; unusual arrangement of liver cells ; growth of new bile ducts ; and seeming increase of fibrous tissue but the appearance being in fact due to death and absorption of parenchymal cells. Second the taking away at operation of half to two-thirds of the liver, a loss made good in the normal rat in 14 days. Third the aseptic grafting in a healthy rat of some of its liver into its omentum, where the structure of the graft undergoes no change in 14 days.

" After a single toxic dose of carbon tetrachloride there is little evidence of change in the liver, except for diffuse congestion, until between the fifth and twenty-fourth hours. Hydropic and fatty degeneration then appear in the liver cells of the central and mid-zonal regions of the lobules. The extent of the degeneration and its tendency to pass on to necrosis depend on the size of the dose. The altered cells map out a complicated lobular pattern. The damaged areas are soon invaded by leucocytes and especially by histiocytes, the Kupffer cells of the unaffected parts becoming more prominent and perhaps contributing to the increased cellularity. By the third day removal of damaged and necrosed liver cells is proceeding, laying bare the mesenchymal supporting stroma and the sinusoids. Repair is going on actively, chiefly through mitotic division of the healthy liver cells, not only at the borders of the areas of necrosis but diffusely throughout the organ. The portal canals frequently contain more cells including lymphocytes, histiocytes and some fibroblasts. By the seventh day the dead tissue has been removed. Repair is complete by the fourteenth day. At no time is there any sign of bile-duct proliferation."

There is no need to put out in detail the outcome of doses given in series to rats, but this footnote is important :—

" One of us (W.A.E.K.) has personally investigated in Ceylon a case of severe liver damage following rapidly repeated therapeutic doses of carbon tetrachloride together with chenopodium. The liver showed extreme fatty degeneration while the kidneys were intensely congested."

Though such a series of doses at short intervals is rarely given to man, yet the effect of these on liver regeneration in experimental animals has this lesson for those who give one dose only to man :—

" During the pre-cirrhotic stage between the sixth and twenty-first doses the liver reverts to normal on discontinuing the drug because the liver cells can still proliferate actively and make good the damage produced up to this stage. Later on, since its cells are becoming less capable of proliferating and of repairing any damage, the liver as a whole is less capable of a return to normal on removal of the toxic agent." It is added " Through the action of a number of widely varying toxic agents there results destruction of liver cells."

[That is to say it seems to be the case that should one of these toxic agents be at work when a dose of this drug is given, the giving of it may take the liver over the line limiting possible regeneration, with death as its outcome.] The point is made that " rats receiving repeated doses of carbon tetrachloride differ in the recuperative power of their livers." [This is the experience after one dose in man.] There is a valuable review of the literature. *C. L.*

Boulos (A.). **Clinical Observations on Carbon Tetrachloride Poisoning.** —*Jl. Egyptian Med. Assoc.* 1936. Jan. Vol. 19. No. 1. pp. 20–33.

A résumé of the literature with this conclusion from personal experience :—

" In my experience the rate of mortality differs widely in different districts. In a locality like Mit Ghamr with heavy infection, besides the many cases that showed symptoms of intoxication, there are on record three fatalities amongst the few thousand cases treated in the last three or four years. At the same time in Beni Suef, with an extremely low percentage of both ascaris and *Schistosoma mansoni* infection, no case of death was reported and nobody showed any marked symptoms of intoxication during the last ten years."

Dervillée (P.). L'intoxication expérimentale par le tétrachlorure de carbone. Données générales et recherches personnelles.—*Jl. Méd. de Bordeaux.* 1936. Feb. 10. Vol. 113. No. 4. pp. 91–102. With 2 figs. [32 refs.]

Garcia (E. Y.) & Africa (C. M.). *Diphyllobothrium latum* (**Linnaeus, 1758**) **Lühe, 1910, in a Native Filipino.**—*Philippine Jl. Sci.* 1935. Aug. Vol. 57. No. 4. pp. 451–457. With 3 figs. on 1 plate. [11 refs.]

The first case of this infection reported from the Philippines. A Filipino boy of 7 died of anaemia. The parasite was then passed. Past active helminthological surveys in the Philippines have never shown the infection. It occurred in a town where *Cyprinus carpio* was introduced 8 years ago. *C. L.*

Kourí (Pedro), Basnuevo (José G.) & Arenas (Rogelio). Contribución al conocimiento del ciclo evolutivo del *Strongyloides stercoralis.* (Nota previa.) [**The Cycle of Evolution of** *Strongyloides stercoralis.*]—*Rev. Parasit., Clin. y. Lab.* Habana. 1936. Jan.–Feb. Vol. 2. No. 1. pp. 1–6. With 13 plates & 1 fig. English summary.

It is stated that during faecal culturing for 8 months there were obtained many generations of the parasite, *Strongyloides stercoralis,*

the later ones producing only rhabditiform larvae and egg-bearing females which have become parthenogenetic. At the same time intrauterine eggs become fewer and fewer. [It will be remembered (Faust, this *Bulletin*, 1934, Vol. 31, p. 129) that the parasitic stages are after all not parthenogenetic, so the suggestion that this condition occurs in the free stages will hardly be accepted on the evidence offered.]

C. L.

Kourí (Pedro) & Sellek (Antonio). Sobre el tratamiento de la strongyloidosis por el violeta de genciana. [**Treatment of Strongyloides Infestation by Gentian Violet.**]—*Rev. Parasit., Clin. y. Lab.* Habana. 1936. Jan.–Feb. Vol. 2. No. 1. pp. 7–16.

At the Municipal Hospital for Children, Havana, among 1,854 children whose stools were examined during a period of 14 weeks in the latter half of 1935, 15 were passing larvae of *Strongyloides stercoralis*. Previous methods of treatment—with oil of chenopodium, male fern, carbon tetrachloride, thymol, santonin ; with injection of emetin and arsenicals, alone and combined—had proved ineffectual. Seven of the 15 have been treated with gentian violet, 1 or 2 capsules daily, each containing 0·05 gm., according to age ; the dosage was regulated as 1 cgm. daily for each year of age. The effect of treatment was controlled by microscopical examination of the faeces. In 5 of the 7 patients larvae disappeared within the week and did not recur ; in 2, 1 of whom received the dye for 8 days, the other for 10 days, larvae were still being passed, so after a week's interval the drug was resumed, and in 3 days more larvae were no longer seen. Two suffered from nausea and vomiting, but not severely. The dye had no action on hookworm, trichuris or ascaris.

H. H. S.

Beach (Ted de Vinne). **Experimental Studies on Human and Primate Species of Strongyloides. V. The Free-living Phase of the Life Cycle.**—*Amer. Jl. Hyg.* 1936. Mar. Vol. 23. No. 2. pp. 243–277. [22 refs.]

The experiments deal with *Strongyloides simiae*. Perhaps the following is of importance for man :—

" Free-living adults of the first, second, and third generations were grown on artificial culture media. Filariform larvae were produced from all 3 generations as well as eggs and rhabditiform larvae of the fourth generation. An actual count made of 1 culture at the termination of the experiment showed 629 offspring present, a number which would be expected from 4 first generation and 6 second generation females. This continuation of the sexual free-living cycle is believed to occur normally in nature under optimum conditions. Attempts to transplant larvae and adults to fresh culture media were unsuccessful."

C. L.

Chandler (Asa C.). Studies on the Nature of Immunity to Intestinal Helminths. III. Renewal of Growth and Egg Production in Nippostrongylus after Transfer from Immune to Non-Immune Rats.—*Amer. Jl. Hyg.* 1936. Jan. Vol. 23. No. 1. pp. 46–54. With 1 fig.

Otto (G. F.). **Blood Studies on Trichuris-infested and Worm-free Children in Louisiana.**—*Amer. Jl. Trop. Med.* 1935. Nov. Vol. 15. No. 6. pp. 693–704. [34 refs.]

There is nothing to make for the belief that trichuris infection was the cause of any change in the blood picture.

Faecal examination was by the Stoll-Hausheer method [which uses 0·005 cc. of faeces] and, in most of those in whom no eggs were seen by it, D.C.F. was used in addition.

"The blood picture was studied in 550 rural white children 5 to 14 years old in south-central Louisiana. Of these 197 were infected with trichuris; 140 with trichuris and some other intestinal worm, usually ascaris; and 213 were worm-free. The blood picture was essentially the same in all groups, *i.e.*, 11·22 to 11·52 grams hemoglobin per 100 cc. blood; 4·5 to 5·0 million erythrocytes per cmm. blood; mean corpuscular hemoglobin of 23·0 to 23·7 micro micrograms; and a relative lymphocytosis of 46·4 to 47·2 per cent. These children are known to suffer from under-nourishment and it is suggested that most of them, both parasitized and worm-free, suffer from a nutritional anaemia." *C. L.*

Battaglia (Alberto) & Arata (Esteban C.). Anemia perniciosa por tricocéfalos trichiurus. [**Pernicious Anaemia and Trichuris Infestation.**]—*Prensa Méd. Argentina.* 1936. Apr. 29. Vol. 23. No. 18. pp. 1094–1101. [15 refs.]

A case is recorded of an Italian woman, 29 years of age, who had suffered for some 6 months with vague abdominal pain, attacks of vomiting, increasing pallor and emaciation. Her blood contained 1,870,000 red corpuscles and 2,800 leucocytes per cmm., haemoglobin 60 per cent., colour index 1·6; there was marked anisocytosis, poikilocytosis with megalocytes and erythroblasts. No malaria parasites were found, the W.R. was negative; in fact the only cause discoverable was the presence of *Trichuris trichiura*. The anaemia slowly cleared up after treatment, the details of which are not given. *H. H. S.*

Ujiie (N.). **On Acute Appendicitis connected with Intestinal Parasites.**—*Taiwan Igakkai Zasshi (Jl. Med. Assoc. Formosa).* 1935. Nov. Vol. 34. No. 11 (368). [In Japanese pp. 1773–1789. With 10 figs. on 1 plate. [67 refs.] English summary pp. 1789–1790.]

The author examined macroscopically and microscopically 330 appendices removed for acute appendicitis in Taihoku, a subtropical part of Formosa. Twenty-three, or 7 per cent., showed signs or actual presence of helminthic affection; 20 with Enterobius, 2 with Trichuris and one with Ascaris. In four of the Enterobius cases, the Ascaris and one of the Trichuris cases, apart from mere irritative and traumatic lesions of the mucosa, there was invasion by bacteria and definite inflammatory changes. The former has been named by Aschoff *Appendicopathia oxyurica.* *H. H. S.*

Heathman (Lucy S.). **Laboratory Diagnosis in Trichinosis.**—*Amer. Jl. Hyg.* 1936. Mar. Vol. 23. No. 2. pp. 397–409. With 2 charts. [23 refs.]

After reviewing the relevant literature on this subject the authors analyse the results of intradermal and precipitin tests obtained in 55 patients who contracted trichinosis in 7 different outbreaks. Only one case was fatal.

The technique employed in the preparation of antigen was similar to that of Bachman (1928) for both precipitin and skin tests, and in 26 instances antigens supplied by Bachman as well as those prepared

in the local laboratory were used. In performing the skin test in man the immediate type of reaction described by AUGUSTINE & THEILER (1932) was observed; in only a limited number of cases were observations on the delayed reaction made.

In 22 out of 44 cases (50 per cent.) the skin tests showed an immediate positive reaction. In only 22 patients was a delayed reaction looked for; it was present in 11 (50 per cent.). Of these 7 had shown no immediate reaction. In 22 children used as controls none gave positive reactions. Precipitin was present in 30 out of 42 sera, *i.e.* 68·2 per cent.; the majority reacted to a 1 in 6,000 dilution of antigen. An eosinophilia of 10 per cent. or more was noted in 93·2 per cent. of cases and in 39 persons it exceeded 20 per cent. In the one fatal case, infected 38 days previously, blood collected 4 days before death showed no eosinophilia; the skin test was also negative, but the precipitin test was strongly positive.

Only 13 out of 30 heavily infected guineapigs gave positive skin tests (*i.e.* 43·3 per cent.) and these appeared from the 7th to the 45th day. Only 3 out of 30 gave a positive precipitin test.

The author concludes that, though precipitin and skin antibodies occur in quite a high percentage of trichinosis patients, the reactions are not sufficiently early or regular to be of great diagnostic aid. They are less frequent in experimentally infected animals than in man. Eosinophilia, muscle biopsy and the study of suspected meat are regarded as of more value from the viewpoint of laboratory diagnosis.

N. Hamilton Fairley.

DIAZ MARTIN (Luis). Consideraciones sobre varios casos de triquinosis. [**An Outbreak of Trichiniasis.**]—*Medicina Países Cálidos.* Madrid. 1936. Feb. Vol. 9. No. 2. pp. 75–86. [10 refs.] [Summary appears also in *Bulletin of Hygiene.*]

The outbreak recorded here occurred in San Martín de Trevejo, Cáceres, in December, 1935; twenty-one individuals were attacked, members of one family and their friends, and infection arose from ingestion of pork sausages made at home for a family celebration. The ages of the patients ranged between 2 and 56 years. The symptoms were typical and eosinophilia was present in nearly all, ranging between 6 and 40 per cent., but two who presented other characteristic symptoms had no eosinophilia, 1 per cent. only. One of these, a woman of 20 years, showed facial oedema and muscle pains increased by pressure; the other, a woman of 44 years, suffered from debility, shivering and chills, intense lumbar pain, and facial oedema. The incubation period, that is the interval between the time of ingestion and the appearance of the " first symptoms " [the early, irritant symptoms were absent, at all events no mention of them is made], was 15–20 days. All showed fever, but in most slight, and lasting for 5–6 days. There was marked insomnia in the early stages, later equally persistent drowsiness. Attempts were made to obtain embryos in the blood by withdrawing 10 cc. from a vein between the fifth and eighth days of illness. To the blood was added 100 cc. of 3 per cent. acetic acid, and the mixture centrifuged and washed several times with the acetic acid; smears were made of the deposit and stained by Giemsa, but no embryos were found. Treatment by purgation and thymol was tried and for the adults neosalvarsan in an initial dose of 0·15 gm. and increasing with administration at four-day intervals. The milder cases received

only the former and for the muscular pains sodium salicylate. Examination of the local pigs showed a high percentage (6) of infestation.

H. H. S.

Alicata (Joseph E.). **Infectivity of *Trichinella spiralis* after Successive Feedings to Rabbits.** [Abstract.]—*Jl. Parasitology.* 1935. Dec. Vol. 21. No. 6. p. 431.

"Experiments were performed which involved the passage of non-lethal doses of trichinae every 32 days from two rabbits to two other rabbits until 7 pairs of rabbits were used. The initial strain of larvae was obtained from experimentally infested guinea pigs. The muscles of rabbits receiving the seventh generation of trichinae were heavily infested with larvae. The virulence of the larvae was not diminished as a result of their passage through rabbits seven times in succession, since a guinea pig and a rat fed lethal doses of these larvae died of intestinal trichinosis 4 days after feeding. During the past 7 years the writer has passed a strain of trichinae from guinea pig to guinea pig about once every two months; on 3 or 4 occasions the strain was passed through a rabbit and again transferred to guinea pigs. The above findings are at variance with those of Bachman and Oliver (1934) who found that a strain of trichinae, passed from rabbit to rabbit 20 days after infection, died after the fifth feeding. Bachman and Oliver assumed that the worms lost their virulence and numbers due to successive passages through rabbits. The present writer is of the opinion that Bachman and Oliver did not allow enough time for sufficient larvae to reach the infective stage in the muscles of the rabbits, and that repeated feedings of fewer and fewer infective larvae to successive rabbits gradually reduced the number of infective larvae, the final feeding being entirely negative."

Niño (Flavio L.). Triquinosis experimental en la rata. [**Experimental Infestation of Rats with Trichinella.**]—*Bol. Inst. Clín. Quirúrg.* Buenos Aires. 1935. Vol. 11. Nos. 97–98–99. pp. 336–350. With 21 figs. & 3 plates. [12 refs.]

The author carried out two sets of experiments. The source of his material was the diaphragm of a pig heavily infested with *Trichinella spiralis*. In the first experiments he fed the animals with the muscle finely divided and mixed with bread and milk and then at intervals killed them and examined the tissues microscopically; in the second another series was fed with part of the same material after it had been 22 days in an ice-chest. Histological details of the findings are described briefly in the text and clearly depicted in photomicrographs. The worm was never found in the lymph tissue of Peyer's patches nor in the lymph glands, but was seen in the gland pits of the mucosa by the fourth day. Many of the rats succumbed within the first week, and showed ulceration and necrosis of the intestinal mucous membrane. At the end of the second week these lesions had practically healed, but the females with packed uteri were seen at the bottom of the glands together with some free embryos; the surrounding tissue contained many eosinophiles. At the same time embryos were found in the heart blood and the striated muscle fibres. This invasion of the muscles appeared to go on for a week or so, the embryos being about 120 μ long by 10–12 μ broad. During the succeeding 10 days they double and may even treble in size and are becoming encysted and

in 25 days after invading the muscles, or 40 from the time of ingestion they are encapsuled. Thereafter the cyst begins to calcify or disintegrate. *H. H. S.*

McCoy (O. R.). **The Development of Trichinae in Abnormal Environments.**—*Jl. Parasitology.* 1936. Feb. Vol. 22. No. 1. pp. 54–59.

"When sterile larvae of *Trichinella spiralis* were injected into the membranes of living chick embryos or into the amniotic sacs of rat embryos, a small percentage of them developed to the adult stage. The rate of growth in rat embryos was the same as in the normal intestinal environment, but in chick embryos it was somewhat retarded. Development of trichinae also occurred in the lumen of the uteri of pregnant rats, but when larvae were injected into non-pregnant uteri, they were rapidly killed. In a few animals it appeared that normal migration of young trichinae to the muscles of the mother rat took place from female worms which had developed in the uterus. A small series of female rats showing intestinal immunity to a second infection with Trichinella larvae given by mouth failed to manifest any significant immunity in the uterus." *C. L.*

Theiler (Hans) & Augustine (Donald L.). Zur Frage der immunbiologischen Diagnose der Trichinose. *Zent. f. Bakt.* I. Abt. Orig. 1935. Nov. 15. Vol. 135. No. 4/5. pp. 299–309. [23 refs.]

O'Connor (F. W.) & Hulse (Constance R.). **Studies in Filariasis. I. In Puerto Rico.**—*Puerto Rico Jl. Public Health & Trop. Med.* 1935. Dec. Vol. 11. No. 2. pp. 167–272. With 26 figs. (22 on 16 plates) & 13 charts. [42 refs.] [Spanish version pp. 273–367.]

These studies were put through at intervals during 1929, 1930 and 1931 and their scope covers general as well as local problems.

The worm in question is *Wuchereria bancrofti* and the insect host *Culex fatigans*. The infection is highest in the northern part of the island with its more abundant ground water and greater moisture in the air, and in other places where movement of air is poor. Mosquitoes are bred freely: in barrels used for collecting rain water from roofs, in the swamps which are present round every town and in irrigation ditches within them. Screening of houses is rare, either because it cannot be afforded or because it makes them too hot. On the other hand all persons are completely clothed, only head, hands and ankles being unprotected from mosquitoes. The worst shacks have at most two rooms, overfilled with families of six or more, and there filariasis is abundant, and *C. fatigans* is seen sheltering behind clothing and under beds. Laundresses bring wet clothes into the house, so making an atmosphere suitable for Culex. As is seen from cases and histories given, the infection is often one of the family, with infected mosquitoes found in and under the house itself. The biting time of *C. fatigans* is the evening and early part of the night, that is to say, well before the microfilarial wave in the blood is at its height [a fact which may need a readjustment of the ideas regarding the value of periodicity for the survival of the worm species].

The peak of the microfilarial wave is at no really fixed hour. In the same man on two occasions it was reached at 2 a.m. and 4 a.m., and in 3 brothers at 1, 1, and 5 a.m. There is made a close study of the clinical signs, and the conclusion that "each case requires careful individual study, and that the efficacy of therapeutic or surgical measures depends on locating the active center of the disease." Again there is stress on mental sequelae (for deaths from suicide have a high

place) and on economic loss. O'Connor's method for making serial sections on a great scale is clearly put forward, and the pathology is closely described and freely illustrated in a section which will repay detailed study. Differential counts on a large scale have been made, both two-hourly ones in relation to the microfilarial wave in the blood and others made daily, and both show a striking inverse relationship in the numbers of polymorphs to lymphocytes. Filariasis and leprosy often occur together for both are common in the overcrowded dwellings of the poor. These are points which seem the most important to the reviewer, but the report on this very large piece of work must be read itself by those who wish to get the best from it. *C. L.*

Tisseuil (J.). Filaire de Bancroft en Guyane : statistique, rôle pathologique. [**Filariasis in Guiana.**]—*Bull. Soc. Path. Exot.* 1936. Jan. 8. Vol. 29. No. 1. pp. 47–49.

A statistical study comes to the conclusion that the presence of filariae, as shown by microfilariae with nocturnal periodicity, has no influence at all on the appearance of elephantiasis or lymphangitis.

Examination of over 300 cases by Thézé & Leger in 1916 and 1917 gave a microfilarial percentage of just under 28. The author's examination of 241 cases gave a positive percentage of 18·6. He concludes that the incidence is falling. The youngest found infected was a girl of 8. The infection is not familial nor one of the town. Of 20 cases of elephantiasis 5 showed microfilariae and of 15 cases of lymphangitis 3 did. Lymphadenitis is rare. *C. L.*

Sanz Astolfi (J.). La filariosis en el Norte de Marruecos. [**Filariasis in Northern Morocco.**]—*Medicina Países Cálidos.* Madrid. 1936. Jan. Vol. 9. No. 1. pp. 16–25. With 3 figs.

Dr. Gonzalez, an ophthalmologist, sent to the author a worm extracted from the eye of a patient who had come to consult him. This proved to be an adult *Loa loa* and examination of the blood revealed an abundance of embryos. The infestation had been acquired in the French Congo. A short time after the author found embryos of *W. bancrofti*. This patient was a native of Tangier where he had always resided, occasionally paying brief visits to Gibraltar. His father, however, had been to the tropics, and it may be that the son had been infested from the father. Later, a third case, also a *bancrofti* infection, came under the author's observation, a native of Cadiz, who for the last 8 years had lived in the neighbourhood of Morocco, at first in Tetuán, then in Tangier. It is thought (1) that patients become infected by troops returning from the tropics and staying in Gibraltar ; (2) that cases are probably more numerous than is generally believed, for the above showed no symptoms clinically indicative of filarial infestation, and (3) that spontaneous cure may occur.

H. H. S.

Teichler (G.). *Mikrofilaria bancrofti* in Bauchzyste und Hydrozele. [**Embryos of *W. bancrofti* in an Abdominal Cyst and a Hydrocele.**]—*Arch. f. Schiffs- u. Trop.-Hyg.* 1936. Jan. Vol. 40. No. 1. pp. 32–34.

A description of 2 cases and a note on the action of drugs on microfialriae *in vitro*.

The first case was one of an abdominal cyst behind the peritoneum evidently lymphatic in nature: volume 3 litres; fluid clear and brownish yellow, s.g. 1,015, containing many characteristic *Mf. bancrofti*. There were none in the blood; but in this there was a secondary anaemia, with eosinophils 12 rising later to 20 per cent. There were no adult worms in the wall of the cyst. There is no mention of any examination for enlarged lymph glands.

The second case is of hydrocele, the only one seen among hill dwellers though they are common in those living in the plains. It contained many *Mf. bancrofti*.

Microfilariae were killed in a quarter of an hour *in vitro* by 0·001 gm. methylene blue, 0·005 gm. quinine, or 0·005 gm. atebrin per cc. of fluid and within half an hour by 0·006 neosalvarsan, 0·01 tartrate of antimony, 0·001 trypaflavine and 0·02 Tr. iodi. Teichler notes good effects from high doses of quinine in acute inflammatory elephantiasis. *C. L.*

Kau (Z. M.). **Chronic Filariasis of the Spermatic Cord. Report of Three Cases.**—*Chinese Med. Jl.* 1936. Jan. Vol. 50. No. 1. pp. 40–45.

Three cases of chronic filariasis of the spermatic cord are described. It appears that the condition has not before been reported in Chinese literature. The adult worms were found in sections of excised material. A note adds information as to a fourth case. Microfilariae might or might not be present in the blood. *C. L.*

Iyengar (M. O. T.). **Entry of *Filaria* Larvae into the Body Cavity of the Mosquito.**—*Parasitology.* 1936. Mar. Vol. 28. No. 2. pp. 190–194. With 3 text figs. & 7 figs. on 1 plate.

It is from the cardiac portion of the midgut and in the proventriculus that microfilariae enter the perivisceral cavity of the mosquito.

Iyengar worked with *Culex fatigans* and *Wuchereria bancrofti* and with *Mansonia* (*Mansonioides*) *annulifera* and *Filaria malayi*. "When a mosquito sucks blood containing microfilariae the worms that pass up the oesophagus tend to stay in the cardiac portion of the midgut immediately behind the proventriculus." In the narrow lumen the microfilaria holds itself against the current of the blood feed "by forming strong loops against the wall of the gut." It travels forward to the proventriculus where it has been seen within an hour of feeding. "It would appear that the microfilaria penetrates through the wall of the gut near the proventriculus or in the proventriculus itself, and escapes into the perivisceral cavity of the thorax" leaving its sheath behind it. "No worm-larvae were seen in the haemocele of the abdomen, although they were fairly common in the haemocele of the thorax. . . . In many instances worms were seen in the perivisceral cavity and in between the muscle bundles within an hour and in a few cases within 20 min. of feeding." It appears that penetration is at an end within 2 hours of feeding. Actual penetration of the wall of the proventriculus was not seen. It is believed that a microfilaria which has come into the "stomach" does not have much chance of entry into the body cavity of the mosquito. Those which do get into the haemocele of the thorax make their way between

and into muscle fibres. The paper was received for publication on 30th August, 1935 and published on 17th April, 1936.

[Specimens covering much the same ground were shown by O'Connor & Beatty at a Laboratory Meeting of the Royal Society of Tropical Medicine and Hygiene held on 19th March, 1936, and noticed in the *Lancet* on 4th April, 1936. There were marked differences between what was seen in them and the conditions reported by Iyengar. The number of the Society's Transactions in which their descriptions will appear is still in the printer's hands.] *C. L.*

Augustine (Donald L.) & Drinker (Cecil K.). **The Migration of Microfilariae** (*Dirofilaria immitis*) **from the Blood Vessels to the Lymphatics.**—*Trans. Roy. Soc. Trop. Med. & Hyg.* 1935. Nov. 25. Vol. 29. No. 3. pp. 303–306. With 3 figs. on 1 plate.

"1. An experiment is reported in which microfilariae (*Dirofilaria immitis*) have been injected into the circulation of an uninfected dog.

"2. It has been shown in both donor and recipient that microfilariae readily leave the circulation and enter lymphatics. No evidence of a cellular reaction on the part of the host has been found in relation to living microfilariae." *C. L.*

Hinman (E. Harold). **Attempted Reversal of Filarial Periodicity in** *Dirofilaria immitis.*—*Proc. Soc. Experim. Biol. & Med.* 1936. Jan. Vol. 33. No. 4. pp. 524–527. With 2 graphs.

In two infected dogs lighting and feeding times were reversed for 11 days. "These results cannot be taken as a true reversal of periodicity, although the daily maximum has been moved forward about 6 hours. However, they do confirm the statement that alteration of daily routine exerts an influence on periodicity." *C. L.*

Darriba (Antonio R.). Oncocercosis americana. [**Onchocerciasis in America.**]—*Medicina Países Cálidos.* Madrid. 1935. Dec. Vol. 8. No. 12. pp. 561–573.

A general review of the subject of onchocerciasis, pointing out that the disease has been known to exist in Guatemala since 1915 when Robles first described its presence there and in Mexico since 1923 on the evidence of Fülleborn. As a general article much of it is taken up with an account of the condition in Africa, its symptoms, mode of transmission, diagnosis and treatment. *H. H. S.*

Rodhain (J.) & Gavrilov (W.). Un cas de localisation profonde de "Microfilaria volvulus." [**Embryos of** *O. volvulus* **in the Deeper Tissues.**]—*Ann. Soc. Belge de Méd. Trop.* 1935. Dec. 31. Vol. 15. No. 4. pp. 551–560. With 9 figs. on 4 plates. [14 refs.]

Microfilaria volvulus was found in numbers in the connective tissue of certain organs and in blood capillaries.

The material was from the body of a leper woman. Microfilariae were numerous in the connective tissue of the mammary gland, rare in the spleen, rarer still in the kidney, absent in caseous lymph glands about the bronchi and in the mesentery, but present in the connective tissue about the latter, present in the blood capillaries of the liver and in fair numbers in its perilobular connective tissue. They were

as numerous in the connective tissue of the "cubital nerve" as in the mamma. The failure of others to find them in deep connective tissue is noted. *C. L.*

MÜHLENS (P.). Ein Fall von *Onchocerca volvulus* bei einem Deutschen aus Kamerun.—*Arch. f. Schiffs- u. Trop.-Hyg.* 1936. Jan. Vol. 40. No. 1. pp. 28–32. With 8 figs.

LINDBERG (K.). Remarques sur l'épidémiologie de la draconculose dans l'Inde britannique. Un plaidoyer en faveur de recherches. [**A Plea for Investigation of Dracontiasis in India.**]—*Bull. Soc. Path. Exot.* 1935. Nov. 13. Vol. 28. No. 9. pp. 866–875. [15 refs.]

A report on uncompleted work, its purpose being to put forward points on dracontiasis which are in need of being cleared up.

The work was carried out in the Deccan. Two new cyclops are named but no details of structure are given in this paper, though they will be in another journal. They are *C. multicolor*, whose death takes place after only one guineaworm larva has made its way into it, and *C. vermifer*, which is, with *C. leuckarti*, a good larval host here. The need for more detailed work is seen when the point is made that in the endemic area there is at least one village where those living there have not even knowledge of the infection and where both these cyclops species are present in numbers. One possible explanation is seen in the experience of another village in which most men had had infection with the worm; in 1932 the steps of the step well were taken away and a wall put up round it, and the village is now free from infection.

C. L.

LINDBERG (K.). Arthrites suppurées du genou dans la dranconculose et arthrites suppurées cryptogénétiques. [**Joint Suppuration associated with Dracontiasis.**]—*Rev. Méd. et Hyg. Trop.* 1935. Sept.–Oct. Vol. 27. No. 5. pp. 215–230.

A report on 12 cases of aseptic suppuration of the knee in regard to which the author's belief is that they were caused by the guinea worm.

This arthritis may make its appearance before the worm does, and inflammation is put down as the probable result of a toxic excretion from it, or it may be a synovial reaction from the worm's nearness, or the worm may discharge larvae into the cavity of the knee. In endemic regions such suppurations are held to be dracontiastic even when no worm is seen, and they occurred in 10 of 30 cases where there was a guineaworm near the knees. *C. L.*

SAYAD (W. Y.), JOHNSON (V. M.) & FAUST (E. C.). **Human Parasitization with** *Gordius robustus*.—*Jl. Amer. Med. Assoc.* 1936. Feb. 8. Vol. 106. No. 6. pp. 461–462.

A tumour in the eyelid became inflamed and was cut out. In it was a gordiid worm believed to be *Gordius robustus* and to be the first certain case from man. It was small and sexually immature.

C. L.

DELBET (Pierre). Sur la nocivité du pain blanc. [**The Harmfulness of White Bread (in Connexion of Gongylonema and Cancer in Rats).**]—*Bull. Acad. Méd.* 1936. Feb. 11. Vol. 115. No. 6. pp. 267–271.

Before accepting gongylonema as itself able to produce cancer in rats, a connexion worked out by FIBIGER, diet deficiencies in magnesium and vitamin A must be taken into account.

FIBIGER fed his rats on white bread alone, and this diet will itself produce some thickening of squamous epithelium. Gongylonema produces no lesions in rats fed on a good diet ; but in those fed on white bread it produces cancer. White bread has little magnesium and little vitamin A. Which of these deficiencies, taken together with gongylonema, is the cause of cancer, is unknown. *C. L.*

DI AICHELBURG (Ulrico). I fenomeni immunitari nelle elmintiasi. [**Immunity in Helminthiasis.**]—*Giorn. Ital. di Malat. Esot. e Trop.* 1936. Apr. 30. Vol. 9. No. 4. pp. 67–70, 73–5, 77.

A general review of the subject, dealing with natural and acquired immunity, with serum reactions, anaphylaxis and the antigenic properties of worms. There are no new facts brought forward, but the paper is well documented with nearly 200 references. These are referred to by number in the text, but unfortunately are not listed at the end of the paper. A note states that " the bibliography will be published in the extracts," but as it stands the value of the article is much reduced by its absence. *H. H. S.*

SCHULZ (R. E.) & SCHICHOBALOWA (N.). Immunität bei Wurminvasionen. [**Immunity in Helminthiasis.**]—*Med. Parasit. & Parasitic Dis.* Moscow. 1935. Vol. 4. No. 4. [In Russian pp. 257–280. German summary p. 280.]

A detailed review of the present knowledge regarding immunity in helminthic infections. *C. A. Hoare.*

LEPROSY.

LEPROSY REVIEW. 1936. Apr. Vol. 7. No. 2. pp. 51–99. With 3 figs. on 2 plates. Quarterly Publication of the British Empire Leprosy Relief Association, 131 Baker Street, London, W.1. [2*s.*]

The only original paper in this issue is a brief historical note on Leprosy in England with a list of 40 leper houses in Devon and Cornwall in 1307.

J. W. LINDSAY also contributes a translated abstract of the reports of a Brazil Conference on Treatment of Leprosy published in the *Revista de Leprologia de São Paulo*, June 1935. Montel's methylene blue treatment was discussed and very varied conclusions come to, none of the investigators being as enthusiastic as Montel, late toxicity, wasting, and even one fatal accident being reported, in addition to improvement in infiltrated lesions and ulcers and the relief of neuralgias and reactions ; the results on the whole were not very encouraging, in spite of the great affinity of the drug for the diseased tissues, but further trials are indicated. Rattlesnake antivenene and osmic acid were advocated in the treatment of leprotic " algias," or reactions. The antivenene was injected subcutaneously twice daily, into or near the painful spot, up to six or eight injections. Osmic acid was injected intravenously in 2 cc. doses of a 2 per mille solution on alternate days up to 5 to 10 doses, and in all of eighteen cases the pains disappeared. The treatment of eye complications was also discussed, but no advance appears to have been recorded. *L. Rogers.*

BRITISH EMPIRE LEPROSY RELIEF ASSOCIATION. **Worse than Slavery : being the Annual Report for 1935.**—36 pp. With 8 figs. London : 131 Baker Street, W.1.

This report contains a record of useful work throughout the Empire. A new feature of this is the supply of a number of voluntary workers by Toc H, who were trained at the Livingstone College to fit them to assist the medical officers of leper settlements in Nigeria by relieving them of much routine work. The Medical Secretary carried out a tour in the West Indies and British Guiana, reports of which have already been dealt with in this *Bulletin*. *L. R.*

KEDROWSKY (W. I.). **Modern Aspects of the Epidemiology of Leprosy.** —*Internat. Jl. Leprosy*. Manila. 1935. Oct.–Dec. Vol. 3. No. 4. pp. 443–451.

This is a theoretical paper based largely on the assumption that recent work regarding a virus stage of the tubercle bacillus can safely be applied by analogy to the leprosy organism. The author discusses hereditary transmission but decides against it. He states that MUIR and ROGERS "point to mosquitoes as possible transmitters of leprosy in tropical countries," whereas they only suggested that the dermal lesions produced by biting insects might admit of the entrance of lepra bacilli in those exposed to infection. The author suggests that the infective agent may enter through the nasal mucous membrane without producing local lesions and pass to the lymphatic system, and that the lepra bacillus may make an abrupt mutation outside the body into some resistant form of a hypothetical nature. *L. R.*

Leprosy in India. 1936. Jan. Vol. 8. No. 1. pp. 1–41. With 1 fig. Issued quarterly by the Indian Council of the British Empire Leprosy Relief Association.

Two original articles are included in this number, one being of local interest in recording further notes on the anti-leprosy work in the Salem district of Madras, where 42 clinics treat 3,217 patients every month, about 25 per cent. of the patients attending regularly. The incidence of the disease has been worked out in detail in small areas, and the figure recorded in the clinics was almost twenty times that of the 1931 census. It varied greatly between 0·25 and 9·5 per cent. in different villages, in many of which the spread could be traced, as the disease is generally restricted to members of the same family and to relatives. There is a preponderance of early nerve cases in children, some of which pass into the cutaneous form as they grow up.

In the other paper S. N. Chatterji describes the early symptoms of leprosy, as seen in the Calcutta outpatient clinic, much on the usual lines. He also records some cases in which the early signs were associated with injuries, which may either have attracted attention to them or possibly have aggravated the lesions. *L. R.*

Del Toro Cano (Fernando). Nuevos casos de lepra en la zona de Protectorado de España en Marruecos. [**Fresh Cases of Leprosy in Western Morocco.**]—*Medicina Países Cálidos.* Madrid. 1936. Mar. Vol. 9. No. 3. pp. 125–128. With 2 figs.

Leprosy appears to be increasing in the western part of Morocco, that under Spanish rule. Twenty were recorded in 1934, and another six in the succeeding year. A few details are given of each of these, all were of the nodular type, one with ulceration. Tetuán furnishes the largest number of cases. The places of residence of all are stated ; 8 were in Tetuán and 4 each in Jolot and Ceuta. *H. H. S.*

Howard (A. C.). **Leprosy in Nigeria.**—*Internat. Jl. Leprosy.* Manila. 1936. Jan.–Mar. Vol. 4. No. 1. pp. 75–78. With 1 fig. (map).

This brief note describes high leprosy incidence in the densely populated Southern Provinces, with many advanced cutaneous cases complicated by malaria, yaws and ankylostomiasis, a number of whom are dealt with in farm colonies. In the Northern Provinces, among the fatalistic Mohammedans, advanced cases live by begging and resent being sent to a settlement, where advanced disabled cases are mainly seen, but attempts are being made to attract earlier cases. *L. R.*

Austin (C. J.). **A Study of Leprosy in Fiji.**—*Internat. Jl. Leprosy.* Manila. 1936. Jan.–Mar. Vol. 4. No. 1. pp. 55–70. [13 refs.]

" Leprosy has been in existence in Fiji from a very early date.

" A leprosy station was established by the Government of Fiji on the island of Beqa in 1900, and the present hospital at Makogai was opened in 1911. The number of patients has increased from 40 in 1911 to 427 in 1933.

" Of the 1,365 cases recorded, 54·7 per cent. were neural in type and 45·3 per cent. were cutaneous. Investigation serves to indicate that

there is no such condition as pure cutaneous leprosy without some degree of nerve involvement.

" The sex ratio of the patients was 3·2 : 1, with 76 per cent. males and 24 per cent. females. No evidence appears that sex played any part in determining the type or course of the disease in these patients.

" There have been 417 deaths in the series, of which about 50 per cent. could fairly be attributed to leprosy.

" Of the cases dealt with, 24 per cent. have been conditionally discharged. There were 33 readmissions, of which 8 have been redischarged to date.

" The most satisfactory improvement occurred in the earlier nerve cases, and it is found that while all types can be improved the prognosis of cutaneous cases as regards cure is comparatively poor." *L. R.*

Massal (E.). La lèpre dans les îles Tuamotou rattachées aux Gambier (îles Reao et Puka-Ruha). [**Leprosy in the Tuamotu Islands (Southern Pacific).**]—*Ann. de Méd. et de Pharm. Colon.* 1935. Oct.–Nov.–Dec. Vol. 33. No. 4. pp. 1023–1038.

The author states that these small French Oceanic islands threaten to become vast leprosaria unless something is done to check the rapid increase of the disease ; for on Rheo 56 of the 340 inhabitants, and on Puka-Ruha 23 of 180 are already infected. Detailed tables of the types of the cases are given and an isolation centre in the island of Reao is recommended for dealing with the problem. *L. R.*

Dunham (George C.). Leprosy in the Philippine Islands.—*Amer. Jl. Public Health.* 1936. Jan. Vol. 26. No. 1. pp. 27–29.

International Journal of Leprosy. Manila. 1935. Oct.–Dec. Vol. 3. No. 4. pp. 389–442.—**Report of the Philippine Leprosy Commission presented to the Governor-General September, 1935.**

This is an important report by a Commission appointed by the Governor to advise on leprosy policy in the Philippines, which the Governor has accepted as the basis of future action. The generally recognised facts regarding the slow infectivity of the disease are first emphasized, and isolation with the best available treatment is advised in the case of bacteriologically positive cases, and outpatient clinic treatment for uninfective ones. Home segregation is unsuited to the local conditions, but group segregation not far from the homes of the people is preferred to further extension of the Culion Settlement, which has become too large for convenient administration with its 7,000 cases, and should gradually be reduced. The success of the local treatment centres has resulted in the majority of those isolated having come voluntarily. In the absence of accurate knowledge of the former incidence of leprosy it cannot be shown statistically whether the disease has decreased or not during the twenty-nine years compulsory segregation has been in force, but it is thought to be decreasing because the majority of the new cases, which have remained fairly constantly at 1,000 yearly during the last five years, are early ones. The successful regional treatment stations, which also provide for isolation of infective cases, now number seven with 1,592 patients, and they include a free skin clinic at which early cases are found. They should be provided

with land for cultivation to make them partially self-supporting, and the Manila city Lazar Hospital should be closed and moved to an agricultural area outside the town.

Children of lepers used to be only separated from their parents at the age of two years or more, and attempts to remove them at birth to nurseries proved very fatal to them, so they were only taken away from their mothers at six months of age. It is now advised that arrangements should be made to provide conditions under which they may be reared successfully when removed at birth. About one hundred children are born to lepers yearly at Culion. A subsistence allowance for lepers is advised.

It has not yet proved feasible to follow up many of the 3,500 paroled lepers, but this should be done, in which case release after being six months negative bacteriologically should be allowed, for the confidence that has developed in the results of treatment now permits the released cases as a general rule to be well received by their families. Recent surveys indicate that relapses number nearly 50 per cent. of those discharged, so follow-up treatment is required. These various recommendations should considerably improve the present methods of controlling leprosy in the Philippines. *L. R.*

Rodriguez (J.), Mabalay (E.) & Tolentino (J. G.). A Medical Survey of the Paroled Negatives Living in the Province of Cebu. A Preliminary Report.—*Monthly Bull. Bureau of Health.* Manila. 1935. Nov. Vol. 15. No. 11. pp. 400–409. With 1 fig. [See this *Bulletin*, 1936, Vol. 33, p. 299.]

Gimeno de Sande (A.) & Fernandez Valdes (A.). Epidemia de lepra en Andújar. [**Leprosy in Andújar.**]—*Rev. San. e Hig. Pública.* 1936. Jan. Vol. 11. No. 1. pp. 17–34. With 6 figs. [28 refs.]

Andújar is a town in the north-west of the Province of Jaén, in the valley of the Guadalquivir, and has a population of 23,559. According to Montanés, there were in 1934 some 928 lepers in Spain of whom 315 were in Andújar with Badajoz and at Jaén 59. In Andújar itself 39 cases are known, *i.e.*, 1·6 per 1,000 population. Twenty-eight have been studied in detail ; one was under 15 years, two between 15 and 20, eleven between 20 and 40, twelve between 40 and 60 and two over 60 years. Direct contact is the chief, perhaps the only, source in the town ; it was proved in two-thirds of the cases and in over half husband or wife contracted it from the other. Of 22 examined bacteriologically the nasal mucus was positive in 20, thick drop in 19 and exudation from skin lesions in 6. [These figures, however, convey but little information as the type of disease is not stated.] *H. H. S.*

de Albuquerque (A. F. Rodrigues). Analyse epidemiologica de 1110 fichas de leprosos da colonia " Santa Izabel," Minas Geraes. [**Analysis of 1110 Cases of Leprosy at the Santa Izabel Colony, Minas Geraes.**]—*Brasil-Medico.* 1935. Dec. 7. Vol. 49. No. 49. pp. 1094–1099. [18 refs.]

This is a careful analysis from the aspects of age, sex, occupation, locality of origin, type and stage of disease, etc. Of the 1,110 patients interned at the Colony males were more than twice as many as females, 2·2 to 1. More than two-fifths, 41·9 per cent., acquired the infection

between the ages of 21 and 35 years. Half the patients were labourers in the fields and 26·5 per cent. were domestic workers. "This fact observed throughout Brazil gives leprosy the character among us of a disease chiefly rural." Nine hundred and fifty-four, or 85·9 per cent. of the total were examined bacteriologically, and 804 or 78·2 per cent. of these were positive. In nearly half, 47·4 per cent., a history of leprous parents was obtained and the probability is that in a large proportion infection was acquired at the homes. *H. H. S.*

KNOTT (James). **Compulsory Segregation of Leprosy. Twenty-Five Years Trial in Saint Croix.**—*Internat. Jl. Leprosy.* Manila. 1936. Jan.–Mar. Vol. 4. No. 1. pp. 71–74.

The author records that twenty-five years' trial of compulsory segregation on the small West Indian Island of Saint Croix, with a population of 14,423 and a leprosy incidence of 7·87 per mille, has not resulted in any appreciable reduction in the disease. On the recommendation of the Danish leprologist, EHLERS, a village colony was constructed for the 87 positive cases of leprosy, since which all known cases have been kept isolated, unless released on parole, yet since 1918, 88 new cases have been admitted and there are now more known cases than 25 or even 57 years ago. The conditions on the island are not unfavourable and the economic status of the people is fairly good ; the people are friendly and they report cases, and all school children are examined yearly. These disappointing results are attributed to the cases not being found early enough. It does not appear that the house contacts of all known cases are frequently examined to enable early cases to be discovered. *L. R.*

RICHARDSON (R. C.). **Experience with Children of Lepers ; at the Miraj Home for Untainted Children.**—*Internat. Jl. Leprosy.* Manila. 1936. Jan.–Mar. Vol. 4. No. 1. pp. 49–53.

This is an interesting record of the results of caring for the untainted children of lepers in the Miraj home of the Mission to Lepers in India, which was opened in 1919 and has since admitted 46 children aged from fifteen days to twelve years. Five died from various conditions during their first year of life, and of the remaining 41 only four developed any signs of leprosy, two becoming cured and the other two improved under treatment, and none passed into an infective stage ; so their isolation from their infected parents has proved very successful. *L. R.*

EUBANAS (Froilan). **The Public Health Aspect of the Parole of Negative Lepers.**—*Monthly Bull. Bureau of Health.* Manila. 1935. Feb. Vol. 15. No. 2. pp. 57–65. [12 refs.]

The author raises the question of the possible danger of infection from the large numbers of lepers released as negative bacteriologically in the Philippines on account of some of them relapsing into an infective stage, and suggests that the present period of six months negative before release should be raised again to one year. On the other hand, he recognizes the value of releasing recovering cases in encouraging other early ones to come forward voluntarily for treatment. He quotes data from papers that have been reviewed in previous issues of this *Bulletin*

regarding the difficulty in following up the released cases and the frequency of relapses among them, and he is in agreement with the recent Commission's recommendation that an efficient follow-up and treatment agency should be provided. *L. R.*

Lie (H. P.). **The Classification of Leprosy.**—*Internat. Jl. Leprosy.* Manila. 1936. Jan.–Mar. Vol. 4. No. 1. pp. 35–44. [10 refs.]

The author considers the classification of leprosy cases adopted by the Manila Conference of 1934 to be a praiseworthy effort, and one that requires amplification. After giving a brief history of the nomenclature of the Norwegian authorities of last century, he suggests the introduction of the addition symbol M to represent the maculo-anesthetic lesions of Hansen and Looft; as, although a few bacilli can be demonstrated by examination of a number of serial sections, they differ from the macules containing numerous lepra bacilli represented in the present nomenclature by the letter N, so that a mixed case might be designated N_3M. He also thinks the use of the letter C for cutaneous may cause confusion and that T to signify "tuber" or nodule is preferable, and a small "t" should be used for "tuberculoid leprosy." The presence or absence of lepra bacilli might also be indicated by B+ or B−. By these various means lesions could be indicated simply by such formulas as NMtB+ or NMtB− for example, in place of long verbal descriptions. *L. R.*

Tisseuil (J.). Essai de classification des tuberculoides de la lèpre. [**Classification of Tuberculoid Leprosy.**]—*Bull. Soc. Path. Exot.* 1936. Mar. 11. Vol. 29. No. 3. pp. 238–242.

The author has studied 200 cases of tuberculoid leprosy in the French Loyalty Islands and proposes the following classification, which may have to be amended by further experience. He has already described primary, secondary, intermediary and "medallion" stages of the lesions; and he now adds as varieties "tuberculoides en aires," "rose-jaunâtre," "parakératosiques," "granitées," "en plateau," "rosées," "rouges" and "brillantes." *L. R.*

Germond (R. C.). **The Modern International Type Classification of Leprosy.**—*South African Med. Jl.* 1936. Jan. 11. Vol. 10. No. 1. pp. 17–25.

This is a description of the Manila Conference classification, with definitions of the terms, which will be useful to those not already acquainted with it. *L. R.*

Muir (E.). **Juvenile Leprosy.**—*Internat. Jl. Leprosy.* Manila. 1936. Jan.–Mar. Vol. 4. No. 1. pp. 45–48.

Under this term the author gives a brief description of cases of leprosy occurring in young children with little resistance to the bacillus when coming into contact with a highly infectious case. It is characterized by the absence of typical clinical symptoms apart from ill-defined macules, keratosis, hypopigmentation in dark skins or erythema in fair ones. The macules vary in appearance from time to time and contain few bacilli, so are difficult to recognize if a bacteriological examination

proves negative. It may be seen as early as in three months old children and is rare after puberty. A negative leprolin test in a child may lead to its detection. The maintenance of the general health and a few hydnocarpus injections are indicated. *L. R.*

CHIYUTO (Sulpicio). Early Leprotic Changes in Children and their Bearing on the Transmission and Evolution of the Disease, II.—*Monthly Bull. Bureau of Health.* Manila. 1934. Dec. Vol. 14. No. 12. pp. 363–396. [18 refs.]

LARA & DE VERA. Clinical Observations with Reference to Leprosy in Children of Lepers.—*Monthly Bull. Bureau of Health.* Manila. 1935. Jan. Vol. 15. No. 1. pp. 17–41. [See also this *Bulletin*, 1932, Vol. 29, p. 543.]

RODRIGUEZ (J.) & PLANTILLA (F. C.). **Observations on the Progress of Incipient Lesions of Leprosy.**—*Internat. Jl. Leprosy.* Manila. 1935. Oct.–Dec. Vol. 3. No. 4. pp. 453–465. With 1 fig.

The authors report further observations on repeated examinations of the earliest lesions among 336 children of lepers, whom they have now followed up for seven years after they had been removed from their parents at various ages. Transfer when of two years of age diminished greatly the number who became positive, although MANALANG and CHIYUTO found on most of them skin lesions that they believed to be early manifestations of leprosy and regard them as " frustrated cases," although many of these lesions must be considered doubtful in nature. Another group of 225 " closed " cases, with definite, but bacteriologically negative dermal lesions, have been studied for from seven months to four years, with an average of about two years, and 31, or 13·8 per cent., have become bacteriologically positive, distributed equally between the two sexes. The red macule is most likely to become positive, and a sudden change in an area of anaesthesia independent of macules was also of ominous import. Positive cases were significantly less among those regularly than in those irregularly treated, although in some even prolonged treatment did not prevent their becoming positive. *L. R.*

PLANTILLA (Fidel C.). **Observations on Leprosy at the Cebu Skin Dispensary.**—*Monthly Bull. Bureau of Health.* Manila. 1935. Jan. Vol. 15. No. 1. pp. 3–16.

Work at out-patient skin clinics has led to the discovery of many early cases of leprosy, although many still come late. Relapses among paroled cases have also been discovered. Recently examination of 577 house and other contacts revealed 21·3 per cent. with suspicious, and 3·2 per cent. with definite, leprous lesions; all the latter showed anaesthesia or lepra bacilli. In women the figure was 3·7 against 2·8 in men, none of the latter being over 25 years of age. The suspicious lesions are very difficult to differentiate from common skin lesions, but it is hoped by following them up to be able to establish which are leprotic and which are not. In 1932 the examination of school children in badly infected areas revealed among 13,586, 2·6 per mille of infections, but this is a very low figure compared with 3·2 per cent. among contacts. The most common lesions are pale pinkish areas and infiltrations. *L. R.*

Pardo-Castello (V.). Leprosy associated with Dermatitis Atrophicans Diffusa et Progressiva.—*Arch. Dermat. & Syph.* 1936. Jan. Vol. 33. No. 1. pp. 12–20. With 6 figs.

Schujman (Salomon). Coexistencia de abceso nervioso y lepra tuberculoide (algunas consideraciones sobre la patogenia destes dos processos). [**Nerve Abscess and Tuberculoid Leprosy.**]—*Rev. Leprologia de São Paulo.* 1935. Dec. Vol. 2. No. 4. pp. 277–289. With 6 figs. [11 refs.] English summary (8 lines).

Three cases are described in which an abscess appeared in the course of a thickened nerve, in two on the arm, in the third on the chin and neck and on the left gluteal region. In each case purulent, broken down material was obtained on incision, containing in one case (the third) a few bacilli, in the others none. The author concludes :—

" The neural leprous abscess is the tuberculoid leprosy of the nerve, or still better, the tuberculoid granuloma of the nerve in open reaction, similar to the reactions observed in the tuberculoid lesions of the skin." Both the leprous abscess and the lepra reaction of tuberculoid leprosy are to be regarded as allergic phenomena (tanto el abceso leproso como la reacción leproso tuberculoide podrian interpretarse como fenomenos alergicos). *H. H. S.*

Esser (P. H.). Psychoses bij lepra. [**Psychoses in Leprosy.**]—*Geneesk. Tijdschr. v. Nederl.-Indië.* 1936. Feb. 25. Vol. 76. No. 8. pp. 463–480. [39 refs.]

This paper is almost identical with that already abstracted. [*Ante*, p. 300.] *H. H. S.*

Tolentino (Jose G.). Leprosy of the Palms and Soles.—*Monthly Bull. Bureau of Health.* Manila. 1934. Sept. Vol. 14. No. 9. pp. 281–287.

Cowdry (E. V.), Heimburger (L. F.) & Williams (P. S.). **A Spectrographic Study of Leprous Lesions.**—*Amer. Jl. Path.* 1936. Jan. Vol. 12. No. 1. pp. 13–29. With 2 plates & 1 graph. [12 refs.]

This is a highly technical paper from which it is concluded that the ratios of P to Ca in five leprous lesions was on the average probably three times those in normal skins, but the Na-Ca, Mg-Ca and Fe-Ca ratios showed no notable variations from the normal. *L. R.*

Lie (H. P.). **Demonstration of the Leprosy Bacillus in the Leprides.**—*Internat. Jl. Leprosy.* Manila. 1935. Oct.–Dec. Vol. 3. No. 4. pp. 473–476.

The author refers to the difficulty in demonstrating lepra bacilli in the ordinary spots of macular leprosy, but has found that with proper technique and sufficient patience he has always been able to demonstrate them, and he thinks that scarcely anyone can doubt that these lesions are due to the presence of the bacilli as long as the process is an active one.

He has now extended his observations to histological examinations of series of sections of the lesions of ten tuberculoid cases sent to him from South Africa, and succeeded in demonstrating a few scattered and often isolated lepra bacilli by the technique he describes in detail, and which should be referred to by all interested. *L. R.*

Pooman (A.). Eine einfache Methode zur Färbung von Lepraerreger und Tuberkelbazillen.—*Arch. f. Schiffs- u. Trop.-Hyg.* 1936. Mar. Vol. 40. No. 3. pp. 112–114. With 1 fig.

Lefrou (G.). La valeur de l'examen du mucus nasal et des biopsies cutanées comme procédés de diagnostic bactérioscopique de la lèpre. [**Examination of Mucus and Sections for Lepra Bacilli.**]—*Bull. Soc. Path. Exot.* 1935. Dec. 11. Vol. 28. No. 10. pp. 889–893.

The author reports his experience of the relative value of the examination of nasal mucus and of sections of leprous tissues respectively in the diagnosis of leprosy. The results are clearly shown in the different forms and stages of the disease in Table I. This brings out the infrequency of nasal infection in the early macular form of leprosy and in nerve cases. Moreover, in the first year of the disease the nasal mucus was only positive in 3·6 per cent., but sections of the tissues revealed the bacillus in 30 per cent. of the cases, and after the first year the nasal mucus was positive in 25 per cent. and sections in an additional 15 per cent., or a total of 40 per cent. He has not found the administration of potassium iodide to increase the number of positive results from the nasal mucus.

Result of the Examinations following the Form of the Disease.

Number of Cases	Clinical Form	Nasal Mucus +	Biopsy +	Total +	Nasal Mucus Percentage +	Biopsy Percentage +	Total Percentage +
130	Macular	2	22	24	1·5	16·9	18·2
35	Papular	11	19	30	31·4	54·2	85·7
21	Tubercular	19	2	21	90·4	9·5	100·0
24	Nervous	3	1	4	12·5	4·1	16·6
210		35	44	79	16·6	20·9	37·6

L. R.

Pieter. Une nouvelle méthode de démonstration du bacille d'Hansen dans quelques lésions non ouvertes de la peau. [**New Method of demonstrating Hansen's Bacillus.**]—*Rev. Méd. et Hyg. Trop.* 1935. Sept.–Oct. Vol. 27. No. 5. pp. 233–234.

The skin over a lesion should be cleaned with ether and acetone, scarified as for von Pirquet's reaction, a small cup applied and the drop of serum thus obtained on a slide stained with eosine and methylene blue, each 10 cgm., by Wright's method. *L. R.*

Lefrou (G.). & Des Essarts (J. Quérangal). Biopsies cutanées et histo-diagnostic de la lèpre. [**Diagnosis of Leprosy by Biopsy Examination of the Skin.**]—*Bull. Soc. Path. Exot.* 1936. Feb. 12. Vol. 29. No. 2. pp. 186–193.

The authors have shown by examinations of the nasal mucus and of small portions of the affected skin that leprosy bacilli can be found in 40 per cent. of cases, and they have inquired if this number can be increased by histological examinations. They report that in 175 cases

simple smears showed the bacilli 44 times, but by close examination of histological sections they found very scanty bacilli in 6 additional cases. They also discuss the tissue changes met with, and find that they are similar to those produced by other granulomatous diseases, such as tuberculosis, syphilis, lymphogranuloma and certain mycoses.

L. R.

Fernandez (Jose M. M.). Bacteriologia de la reacción leprosa. Investigación del *Mycobacterium leprae* en las lesiones cutaneas de reacción leprosa. [**Study of** *Myco. leprae* **in the Cutaneous Lesions of the Lepra Reaction.**]—*Rev. Brasileira Leprologia.* S. Paulo. 1936. Mar. Vol. 4. No. 1. pp. 9–26. With 3 figs. English summary.

The author examined 24 cases of lepra reaction, making a small incision with a scarifier and scraping the edge to obtain serum, spreading the product on a slide, fixing and staining in the usual way. This was done on pre-existing nodules or maculae, on parts apparently healthy at the time of the reaction, and during its regression and in areas round the reacting foci.

In the actual cutaneous lesions of the reaction, at the time and during retrogression, the bacilli were seen in the granular form, sometimes, but not always, with the bacillary form; the granular predominated according to the intensity of the local reaction. The acute period is marked by the degree of polymorphism of the bacillus and by aggregation of them. The skin adjacent to the reacting lesions was always positive, showing the granular forms, whereas apparently normal skin at a distance was nearly always negative. Nodules, macules, and infiltrations though not appearing to join in the reaction often showed abundant granular forms, especially if the reaction was severe. In lepromata at a distance from the site of reaction the organisms were in the usual form of globi of entire bacilli. *H. H. S.*

Manalang (C.). Pathologic and Bacteriologic Survey of Lepers (Post Mortem). II.—*Monthly Bull. Bureau of Health.* Manila. 1934. Nov. Vol. 14. No. 11. pp. 335–340. [11 refs.]

Manalang (C.). **Pathologic and Bacteriologic Survey of Lepers (Post Mortem). IV.**—*Monthly Bull. Bureau of Health.* Manila. 1935. Oct. Vol. 15. No. 10. pp. 361–364.

Post-mortem histological examinations have been made of areas of apparently normal plantar surfaces of the feet of 16 Culion lepers and histological abnormalities found in 94 per cent. and the *M. leprae* in 87·5 per cent. The author therefore thinks that drug infiltration should include the plantar and palmar surfaces, and multiple smears of these areas should be made before parole, and that the infection of the nerves in leprosy is probably always from the periphery. *L. R.*

Manalang (C.). **Pathologic and Bacteriologic Survey of Lepers (Post Mortem). V.**—*Monthly Bull. Bureau of Health.* Manila. 1935. Nov. Vol. 15. No. 11. pp. 391–399. [14 refs.]

In this note the author reports on post-mortem microscopical examinations of the apparently healthy skin of some of the areas believed to be relatively immune to leprous lesions, including the clinically normal

posterior inferior auricular and inguinal regions. In 40 cases examined 16, or 40 per cent., of the auricular regions showed lepra bacilli, which he thinks are derived from the neighbouring lobes of the ears, for the organisms were only found in 4 per cent. in the inguinal region situated further from active lesions. *L. R.*

Bechelli (Luiz Marino). Considerações sobre alguns casos de esplenomegalias na lepra. [**Splenomegaly in Leprosy.**]—*Rev. Leprologia de São Paulo.* 1935. Dec. Vol. 2. No. 4. pp. 213–275. With 16 text figs. & 3 coloured figs. on 1 plate. [52 refs.] English summary.

This article is in three parts ; the first gives details of the physical condition and the results of laboratory investigation of 11 cases of leprosy ; the second treats of the pathological anatomy of the spleen in leprosy. Eight of the 11 gave a positive Wassermann reaction (1–4 plus), one gave a 4 plus Kahn, but negative W.R., in two the serum test is not mentioned. The illustrations in the pathological part of the paper are excellent. The third part considers the differential diagnosis of the causes of splenic enlargement as presented in his cases. He notes that splenomegaly occurred only in nodular and mixed forms, that it was rarely accompanied by pain, and concludes that although examination of material obtained by spleen puncture did not reveal lepra bacilli, nevertheless leprosy itself can cause this enlargement. *H. H. S.*

Campos (Nelson de Souza). Tuméfaction caséeuse des nerfs au cours de la lèpre. Étude des névrites nodulaires caséifiées de structure tuberculoïde. [**Caseous Swelling of Nerves.**]—*Internat. Jl. Leprosy.* Manila. 1936. Jan.–Mar. Vol. 4. No. 1. pp. 1–24. With 26 figs. on 6 plates. [11 refs.]

The author gives a detailed illustrated description of fifteen cases of nodular thickening of the nerves with caseation, and regards the condition as a mild tuberculoid form of the disease with a high degree of immunity. *L. R.*

Takino (Masuichi) & Miyake (Shozo). Die Veränderung der vegetativen Nerven bei der Lepra, besonders bei der infiltrativen Form. [**Nerve Changes in Leprosy.**]—*Acta Scholae Med. Univ. Imperialis in Kioto.* 1935. Vol. 18. No. 2. pp. 85–115. With 5 figs. & 4 plates (1 coloured). [21 refs.]

This is a well illustrated account of the histology of leprotic lesions with descriptions of the formation of globi containing numerous bacilli and the distribution of the organisms in the nerves. *L. R.*

Muir (Ernest). **Cellular Reaction to** *Bacillus leprae.*—*Trans. Roy. Soc. Trop. Med. & Hyg.* 1936. Feb. 29. Vol. 29. No. 5. pp. 547–552. With 8 figs. on 4 plates.

The author summarizes his views on this question with histological illustrations. The symptoms of leprosy are caused by local cellular reactions to the bacillus of very varying types in response to the multiplication of the organisms in the intercellular lymph spaces and cells of the skin and nerves. If the response is weak cell-division is

sluggish and ingestion feeble, with the result that the bacilli become very numerous in vacuolated cells. If the response is strong the lymphoid and endothelial cells multiply greatly and even giant cells form, but very few bacilli are present, as in the tuberculoid type of lesion and abscesses may form in the nerve trunks. In young children the response is weak with little cellular reaction and positive leprolin reactions. The bacilli may accumulate in the nerves, which may be a reason for the difficulty in completely destroying the organisms.

L. R.

Nolasco (J. O.). Calcification and Osteoid Changes in the Nerve in Leprosy. Report of a Case.—*Internat. Jl. Leprosy.* Manila. 1936. Jan.–Mar. Vol. 4. No. 1. pp. 25–28. With 3 figs. on 1 plate.

Tajiri (Isamu). **Leprotic Changes in the Lung.**—*Internat. Jl. Leprosy.* Manila. 1935. Oct.–Dec. Vol. 3. No. 4. pp. 467–470. With 4 figs. on 1 plate.

The author reports on the microscopical examination of the lungs post-mortem in five cases in which tuberculous infection could be excluded. He found no naked eye lesions, but in sections small lepromata were detected in the alveolar septa due to the bacilli of nodular cases reaching the organ through the blood stream. In the macular and neural cases leprotic changes never occur in the lung except in nerves.

L. R.

Lagoudaky (Socrates). **Preliminary Note on Self-Inoculation of Leprosy.**—*Jl. Trop. Med. & Hyg.* 1936. Apr. 1. Vol. 39. No. 7. pp. 81–83.

This is a remarkable account of the intravenous inoculation of the author on three occasions with 3 gr. [*sic.* ? cc.] of blood from a Greek leper twice and a native leper once. A month later he began to get pain in one foot, ten days later two small subcutaneous lepromas appeared on his hands and other lesions during the following month, including anaesthetic spots. He states that lepromas are forerunners of the disease in which microbes are found, and writes of the " ultravirus." He does not clearly say whether bacilli were found in his lesions, but mentions that they cleared up under intradermal treatment begun five months after the first inoculation on June 9th 1934. His colleagues apparently agreed with the diagnosis of early leprosy. *L. R.*

Shiga (K.). **Studies concerning the Leprabacillus. 2nd Communication : Intracerebral Infection with Leprabacilli.**—*Kitasato Arch. Experim. Med.* 1936. Jan. Vol. 13. No. 1. pp. 1–8. With 3 coloured figs. on 1 plate.

The author reports on his numerous animal experiments. He first refers to his previous paper of 1929 [this *Bulletin*, 1930, Vol. 27, p. 339] on the culture of the lepra bacillus, and states that he never succeeded in getting beyond the " microscopic colonies " he had then obtained. He then refers to five years' work at the inoculation of animals with the organism, for which he found mice the most suitable, and mentions that the bacilli lived longer in those fed on diets deficient in vitamins, but removal of certain organs or the use of various drugs and chemicals

failed to increase the susceptibility of his animals, and all the results were negative with the exception of the following. In the course of intracerebral inoculations of over one thousand mice he several times found a large number of lepra bacilli post-mortem, and in one instance the brain, liver and spleen showed distinct leprous changes, with bacilli in the walls of the capillary vessels and reticulo-endothelial cells of the brain, and extensive formation in the liver and spleen of granulomas containing enormous numbers of acid-fast bacilli as shown by coloured illustrations. He thinks these were actually caused by the lepra bacilli, but considers that further investigations on these lines are required. *L. R.*

Watanabe (Yoshimasa). **Experimental Studies on Animals concerning Leprosy. Report V. Experiments on Inheritance of Predisposition for Leprosy of Rat.**—*Kitasato Arch. Experim. Med.* 1936. Jan. Vol. 13. No. 1. pp. 66–69.

The author records breeding from rats infected with rat leprosy, and then testing if their offspring were more susceptible to inoculation with the acid-fast bacillus of the disease than those of healthy rats. The results were negative, so he concludes that the young of infected rats are not predisposed to the disease. He mentions that infected rats can infect healthy ones by biting them, and thinks this to be the natural mode of infection. *L. R.*

Prudhomme (R. O.). Le glutathion réduit dans la lèpre murine. [**Reduction of Glutathion in Rat Leprosy.**]—*C. R. Soc. Biol.* 1936. Vol. 121. No. 12. pp. 1167–1169.

At the suggestion of M. Marchoux the author has examined to ascertain if the reduction in the amount of glutathion in the tissues of tuberculous patients is also present in the case of rat leprosy. He concludes that this substance is not much reduced in the livers and spleens of infected rats unless these organs are seriously involved in the disease, when there is a considerable fall. *L. R.*

Gavrilov (W.) & Dubois (A.). Culture du bacille de Stephansky. [**Cultivation of the Bacillus of Rat Leprosy.**]—*C. R. Soc. Biol.* 1936. Vol. 121. No. 13. pp. 1384–1386.

This brief paper records that the acid-fast bacillus of rat leprosy was cultivated from lesions of the disease on culture media found suitable for the tubercle bacillus such as glycerine agar, Denys' egg medium, potato and Loewenstein's medium, with the substitution of rat serum for human serum. Small colonies appeared after two months and were subcultured successfully up to the third passage. *L. R.*

Bier (Otto G.). Ueber die Serologie der Lepra. V. Die Phenolausflockung unter hypotonischen Bedingungen als Labilitätsäusserung des Lepraserums. [**The Serology of Leprosy. V. Phenol Precipitation of Leper Serum under Certain Conditions.**]—*Arch. f. Schiffs- u. Trop. Hyg.* 1936. Jan. Vol. 40. No. 1. pp. 25–28.

The author has tested the diagnostic value in leprosy of Von Binni and De Blasio's hypotonic phenol precipitation method. They

conclude that the tuberculosis test gave 70 per cent. of positive reactions in nodular and 30 per cent. in nerve leprosy, and the syphilitic test gave 44 per cent. positive in nodular and 30 per cent. in nerve cases of leprosy. *L. R.*

Villela (Gilberto G.) & Castro (Almir). Estudos sobre a biochimica da lepra. I. Cholesterol e esteres de cholesterol no plasma.—*Brasil-Medico.* 1936. Jan. 4. Vol. 50. No. 1. pp. 1–2. With 2 charts.

Jordan (Paul). Uebertragung der Lepra des Menschen auf Zuchtratten mit der Möglichkeit zum Weiterimpfen und auch als fortschreitende Krankheit. [**Inoculation of Rats with Human Leprosy.**]—*Arch. f. Schiffs- u. Trop.-Hyg.* 1936. Mar. Vol. 40. No. 3. pp. 92–112. With 9 figs. [29 refs.]

The author deals with the question of the possibility of inoculating bred rats with human leprosy He concludes that the numerous attempts to do so have twice resulted in producing tumours in the skin of the animals by this means with an incubation period of $1\frac{1}{4}$ to $1\frac{1}{2}$ years. A second passage led to the evolution of the disease to affect the internal organs. *L. R.*

Mochtar (A.) & Sardjito (M.). Gejodeerde chaulmogras aethylicus in de therapie der lepra. [**Iodized Chaulmoogra Ethylate in the Treatment of Leprosy.**]—*Geneesk. Tijdschr. v. Nederl.-Indië.* 1936. Apr. 21. Vol. 76. No. 16. pp. 973–983. With 8 figs. on 2 plates. [10 refs.]

The iodized ethylate of chaulmoogra is the ethyl ester with addition of 0·5 per cent. iodine. It has been used in the treatment of leprosy since about 1920. The addition of the iodine has served to limit the local irritation effect of intramuscular injection and also some of the general symptoms, such as giddiness, fever, headaches and rheumatic pains. Iodine, moreover, is disinfectant and may itself contribute something in the treatment of leprosy. Comparative trials were instituted between the efficacy of alepol, chaulmoogra oil and the ethyl ester, in which the last of these appeared to be the most efficacious, but the numbers under test were very small. Of 43 patients treated with iodized ethylate in 1934 at the polyclinic 23 showed improvement, 17 remained stationary and 4 were worse. Not only is this medicament usable in polyclinic and hospital but is, because of the smallness of the dosage and the slight reaction, specially suitable for large-scale country district operations. Such operations also have the great advantage of being less costly than institutional treatment. These seem to be arguments which justify extended trial of the ethylate of chaulmoogra in leprosy. *W. F. Harvey.*

Roy (A. T.) & Rao (G. R.). **Fluorescein in Lepra Reaction.**—*Indian Med. Gaz.* 1936. Jan. Vol. 71. No. 1. pp. 25–28. With 4 charts.

The authors having previously reported beneficial effects in prolonged lepra reactions from the use of " mercurochrome-220 soluble," a fluorescein compound of mercury, they have tested the value of fluorescein itself, in view of its recommendation by Ryrie, at the Purulia Leper Colony with 800 inmates and 2,000 outpatient attendances monthly. As the term lepra-reaction has been applied to anything from periodic pains through brief febrile self-clearing reactions to severe

prolonged ones, they have confined their tests to prolonged severe febrile rises of over seven days duration, with the exacerbation of old and the appearance of new lesions, and all the twelve cases dealt with were under close observation in hospital. Nine were treated with fluorescein in doses of 10 cc. of a two per cent. freshly prepared solution of Grubler's water-soluble preparation two to three times a week, and records were kept of the erythrocyte sedimentation index and the temperature. Three control cases were treated respectively with potassium antimony tartrate, physiological saline and no special treatment. They conclude that, although two to four injections of fluorescein have an undoubted antipyretic effect, no beneficial effect was obtained on the sedimentation index or in decreasing the debility, and similar falls of temperature occurred in the controls. The drug may be of some value as an alternative to the antimony preparation.

L. R.

Dorolle (P.), Ngo-quang-Ly, Huynh-van-Huy & Tran-van-Tam. Bleu de méthylène et bleu de méthylène-éosine dans le traitement de la lèpre. Étude de la toxicité expérimentale et résultats cliniques obtenus. [**Methylene Blue Alone and with Eosine in the Treatment of Leprosy.**]—*Bull. Soc. Path. Exot.* 1935. Nov. 13. Vol. 28. No. 9. pp. 839–849. [10 refs.]

This paper brings up the number of cases previously reported on [*ante*, p. 309] from 30 to 55, and comes to the same conclusions regarding the value of the treatment, especially when combined with chaulmoogra preparations.

L. R.

Souza-Araujo (H. C.). **Treatment of Leprosy by Methylene Blue.**—*Internat. Jl. Leprosy.* Manila. 1935. Oct.–Dec. Vol. 3. No. 4. pp. 471–473. [11 refs.]

The author points out that the methylene blue treatment of leprosy was first used by Miguel Couto and Mario Rangel in 1927 in Rio de Janeiro, long before Montel, and they obtained the tattooing of the lesions, but only slight temporary improvement, and concluded from a study of ten cases that absolutely no therapeutical result was obtained.

L. R.

i. Montel (R.) & Le-van-Phung. Un cas de lèpre tuberculeuse généralisée Blanchi cliniquement et bactériologiquement en 10 mois. Traitement mixte par le bleu de méthylène et le chaulmoogra. [**Methylene Blue and Chaulmoogra in Leprosy.**]—*Bull. Soc. Path. Exot.* 1936. Jan. 8. Vol. 29. No. 1. pp. 23–28.

ii. Lépine (P.) & Markianos (J.). Résultats obtenus dans le traitement de la lèpre par le bleu de méthylène. [**The Treatment of Leprosy by Methylene Blue.**]—*Ibid.* pp. 28–30.

iii. Berny (P.). Action du bleu de méthylène administré par voie buccale sur les douleurs des lépreux. [**Methylene Blue by Mouth in the Treatment of the Pains of Leprosy.**]—*Ibid.* pp. 30–33. [14 refs.]

i. This is an account of a single nodular case of leprosy of three years' duration, whose symptoms cleared up, with the exception of some remaining nerve thickening and loss of sensation, after 10 month's treatment, including 72 injections of methylene blue, 5 of " carbone

porphyrise " of St. Jaques, 52 of collobiase de chaulmoogra and 13 of Merchado's chaulmoogra mixture.

ii. These workers report a trial of the methylene blue treatment, uncomplicated by the use of other drugs, continued up to 14 months in some cases, following rigorously Montel's method. The first results were encouraging with softening and reduction of nodules by ulceration, and decline of the temperature in febrile cases. Unfortunately the benefit was very limited, as the general course of the disease was not influenced, and some of the patients after a time declined to continue the treatment. They then tried it in early cases with limited cutaneous lesions, but no improvement resulted. In nerve forms and mixed ones no appreciable benefit resulted from prolonged trials. They confirm the tendency of the lepra bacilli to lose their acid-fast characters under the treatment. Although they have obtained no certain improvement in the general condition of their patients, or any profound modification in the course of the disease, they are continuing their trials of the drug.

iii. A trial of methylene blue orally in pill form up to 30 cgm. daily resulted in a rapid reduction in the pains of leprosy patients with relief of considerable duration. *L. R.*

Valle (Sergio). Prophylaxia da cegueira na lepra. [**Prevention of Blindness in Leprosy.**]—*Brasil-Medico.* 1936. Mar. 28. Vol. 50. No. 13. pp. 265–275. With 3 figs.

The insidious march of leprosy, its chronicity in evolution, may lead to blindness in spite of every care and precaution. If the posterior segment of the eye is not involved there may be perception of light for a long time, in fact until the globe atrophies or swells to a staphyloma. According to the author infection enters anteriorly by way of the anterior ciliary arteries through anastomoses with the posterior vessels of the conjunctiva, extending thither from the supraciliary, or palpebral region or neighbouring site. Thus is explained the predilection for the anterior segment and early localization between the *recti* tendons and the cornea. For prophylactic purposes the author employs perilimbic cautery, peritomy, removal of tubercles followed by cautery of the surface. For active lesions he is in favour of copper salts. In acute crises with severe and persisting pain he finds trypan blue, given by the method of Muir and Chatterji, quite satisfactory. He recommends dark glasses to avoid the dazzle in cases of rupture of the iris, to reduce photophobia and protect the insensitive cornea from dust and wind. *H. H. S.*

Nocht (B.). Fieberbehandlung bei Lepra.—*Arch. f. Schiffs- u. Trop.-Hyg.* 1936. Jan. Vol. 40. No. 1. pp. 2–5. With 4 figs. [See this *Bulletin*, 1936, Vol. 33, p. 315.]

Paul (Milroy). **Surgical Measures in Leprosy.**—*Internat. Jl. Leprosy.* Manila. 1936. Jan.–Mar. Vol. 4. No. 1. pp. 29–34. With 1 fig.

At the Hendala Leper Asylum of Ceylon the author found superficial ulcers of the foot in 347, or 52 per cent., of 658 inmates, and perforating ulcer of the foot in 27 patients. In the former he obtained regular success by applying adhesive plaster directly to the ulcers, after cleaning with warm water, and covering with dressings to absorb the purulent discharge, and changing the latter only when they became

soaked, so as to leave the epithelium to grow over the surface undisturbed. No chronic ulcer failed to improve and all healed with perseverance with the method. For perforating ulcers he agrees that necrosed fragments or the whole carious metatarsal bone should be removed, preferably through a dorsal incision. Amputations should be avoided as far as possible, as the patients can rarely wear an artificial limb. For burns of the fingers the tannic acid treatment is not suitable, and he advises the use of bakelite cups, etc., which do not conduct heat well and are not easily broken, in place of metal ones in order to avoid burns of the anaesthetic fingers. *L. R.*

Brown (James A. K.). **Some Dietetic Factors in Leprosy with Special Reference to B Avitaminosis.**—*West African Med. Jl.* 1935. Nov. Vol. 8. No. 4. pp. 1–7. [59 refs.]

The author quotes from various authorities statements regarding the importance of diet in leprosy, and goes on to advocate the administration of vitamins. Working in the Uzuakoli Leper Colony, Nigeria, he found the diet adequate in 57·5, marginal in 20 and inadequate in 22·5 per cent. of his cases. He tested the value of giving vitamin B in the form of marmite and an extract of rice polishings prepared by Messrs. Ferris of Bristol, but states that " the results did not show any definite improvement," although 43·4 per cent. did show gain in weight. It is hoped to test further the use of vitamins A and B.

L. R.

Reenstierna (John). **Therapeutic Tests with an Anti-Leprosy Serum. (In Sweden and Ethiopia.)**—*Acta Med. Scandinavica.* 1936. Vol. 88. No. 2–4. pp. 399–406.

The author states that his serum is made by injecting sheep repeatedly with acid-fast bacilli and their toxins, including Kedrowsky's and Paldrock's cultures and a very similar one the author cultivated from a case of leprosy. A detailed description of its preparation will be published later. The serum has been used in 4 cases at the Jarvso Leprosarium and in over 30 cases at Addis Ababa in Ethiopia, and it is claimed that in all patients except those who were moribund the ulcers healed, nodules subsided and in 65 per cent. of the cases sensibility returned in fingers and toes. The author says that only " a very inconsiderable beginning " has yet been made with the trial of his serum. Further reports will be awaited with interest. *L. R.*

Fischl (Viktor). Zur Chemotherapie der Tuberkulose und Lepra. [**Chemotherapy of Tuberculosis and Leprosy.**]—*Ztschr. f. Immunitätsf. u. Experim. Therap.* 1935. May 29. Vol. 85. No. 1/2. pp. 71–76.

The author gives a table of chaulmoogra and other oils used in the treatment of tuberculosis and leprosy, and he concludes from experiments on mice infected with avian tubercle that no surely efficacious preparation has yet been obtained. *L. R.*

Golovine (S.). Contribution à l'étude du traitement de la lèpre.—*Bull. Soc. Path. Exot.* 1935. Nov. 13. Vol. 28. No. 9. pp. 784–789.

Hoffmann (W. H.). Las modernas orientaciones sobre la lepra.—Reprinted from *Rev. Med. y Cirug. Habana.* 1935. Vol. 40. No. 6. pp. 310–323.

YELLOW FEVER.

Sawyer (Wilbur A.). **The Present Geographic Distribution of Yellow Fever and its Significance.**—Reprinted from the *Harvey Lectures, 1934–1935*. pp. 66–92. With 5 maps. [32 refs.]

An interesting general account of the subject with special reference to yellow fever immunity observations and the new light they throw on the epidemiology and general distribution of the disease. In yellow fever, as in many other infectious diseases, it is becoming evident that missed cases comprise the majority of the infections, and the author mentions that if suitable laboratory tests had been available, the leaders in yellow fever thought and work in the past would not have concluded that the disease depended for its persistence on endemic foci in a limited number of key cities. *E. Hindle.*

Findlay (G. M.) & Davey (T. H.). **Yellow Fever in the Gambia. I. Historical.**—*Trans. Roy. Soc. Trop. Med. & Hyg.* 1936. Apr. 8. Vol. 29. No. 6. pp. 667–678. With 1 chart. [27 refs.]

An interesting compilation of the history of outbreaks of epidemic disease in the Gambia from its discovery in 1455. These periodic outbreaks have been attended by a high mortality and occurred before and after the introduction of cinchona bark as a routine treatment of fever. However, proof that the earlier epidemics were due to yellow fever is lacking, but in view of the problem as to whether the disease is of African or American origin, it is worthy of note that there has been no change in the general character of these epidemics either before or after the discovery of America, either before or after the institution of the slave trade, and either before or after the general introduction of cinchona bark as a routine treatment for tropical fevers.

Since the foundation of Bathurst in 1816, outbreaks of yellow fever have occurred periodically in the town, but have not been recorded in the Gambia Protectorate. There is a faint suggestion that the Bathurst epidemics occur at intervals of either from 5 to 6 or from 11 to 12 years and a chart is given showing their correlation with variations in the sun-spot cycle. Eight out of 11 sun-spot minima between 1825 and 1935 have been associated with outbreaks of yellow fever in the Gambia. Three others occurred at or near the sun-spot maxima, and the fourth outbreak in 1862 was probably merely a continuation of the 1859–60 epidemic. *E. H.*

Durand (R.) & Bonneau (E.). Enquête faite dans un bataillon de tirailleurs sénégalais en vue de déceler, par les épreuves sérologiques, les atteintes antérieures de fièvre jaune. [**An Inquiry made among a Battalion of Senegalese in order to determine, by Serological Tests, Previous Infections with Yellow Fever.**]—*Bull. Soc. Path. Exot.* 1936. Feb. 12. Vol. 29. No. 2. pp. 100–101.

The authors have examined the sera of 31 soldiers from a Senegalese battalion, originally from West Africa but now completing their service in Tunisia. All the subjects were aged from 20 to 35 years and their blood was tested by means of the mouse protection test.

The results are given in the following table, which shows that more than 30 per cent. were positive and supports the view as to the frequency of this infection among the African natives.

Colonies	Number of subjects examined	Positive	Negative
Dahomey	3	1	2
French Sudan	7	4	3
French Guinea	9	5	4
Ivory Coast	8	0	8
Upper Volta	4	1	3
Total	31	11	20

E. H.

Paris: Office International d'Hygiène Publique. Session of May, 1936. Report of the Yellow Fever Commission. [Mimeographed translation.]

Soper (F. L.). Recent Extensions of Knowledge of Yellow Fever. [Annex 1 to Report of Committee on Yellow Fever, Pan-African Health Conference, Johannesburg, Nov. 20–30, 1935.]—*Quarterly Bull. Health Organisation. League of Nations.* Geneva. 1936. Mar. Vol. 5. No. 1. pp. 19–68. With 4 graphs, 1 map & 2 figs. [36 refs.]

Selwyn-Clarke (P. S.). **Yellow Fever in West Africa.** [Annex II to Report of Committee on Yellow Fever Pan-African Health Conference, Johannesburg, Nov. 20–30, 1935.]—*Quarterly Bull. Health Organisation. League of Nations.* Geneva. 1936. Mar. Vol. 5. No. 1. pp. 69–78.

A general review of the subject with special reference to the epidemiology of the disease and preventive measures in West Africa.

E. H.

Lloyd (Bolivar J.). **Public Health Significance of our Newer Knowledge of Yellow Fever.**—*Southern Med. Jl.* 1936. May. Vol. 29. No. 5. pp. 533–536.

A general account, with special reference to the methods of dealing with certain reported cases of yellow fever in the past. *E. H.*

Hicks (E. P.) & Chand (Subedar Diwan). **Transport and Control of *Aëdes aegypti* in Aeroplanes.**—*Records of the Malaria Survey of India.* 1936. Mar. Vol. 6. No. 1. pp. 73–90. With 2 figs. & 1 map. [24 refs.]

Female *Aëdes aegypti* in cages were placed in the baggage compartment of aeroplanes at Karachi and travelled alive to Amsterdam and over a considerable part of the return journey, although they had no opportunity of feeding en route, and also a pyrethrum spray is used as a routine in the cabins. It would seem, therefore, that this mosquito suffers no ill-effects when exposed to reduced atmospheric pressure.

Experiments showed that *Aëdes aegypti* in aeroplanes are destroyed by a spray of "Pyrocide 20" in amounts equivalent to 3 cc. per 1,000 cubic feet, with an exposure of 5 minutes for cabins and baggage rooms and 15 minutes for less accessible spaces. Before use this dose is diluted 1 : 20 with kerosene. The results of some experiments suggested that the killing effect of the mixture varied with the dose of pyrocide and that the degree of dilution was of minor importance, but changes in humidity produced different effects.

The authors examined 106 air liners arriving at Karachi but no mosquitoes were found. After discussing the known distribution of yellow fever in Africa it is concluded that at present there is little danger of the import of infected *Aëdes aegypti* from the Sudan to India, but the danger from Nigeria is rather greater. *E. H.*

STRANGER (H.). Das Internationale Sanitätsabkommen für die Luftfahrt und seine Bedeutung vor allem für die Verhütung des Gelbfiebers im internationalen Luftverkehr. [**The Health Agreement for International Air Traffic particularly with regard to the Prevention of Yellow Fever.**]—*Deut. Med. Woch.* 1936. Mar. 27. Vol. 62. No. 13. pp. 514–518. With 1 map. [Summary appears also in *Bulletin of Hygiene.*]

Owing to the spread of air travel there is a danger that persons who are already infected may travel during the incubation period thousands of miles from where the infection occurred, and even, as in the case of smallpox, spend several days in the country of arrival before the disease develops. In the case of yellow fever with an incubation period up to 13 days [though it is usually only 4 or 5 days] the infection may be carried from the infected parts of Africa to India.

By an international agreement made in 1934 it is provided that officials at air ports can refuse to allow persons to travel who in the opinion of the medical officer attached to the airport show any signs of infectious disease, and may require suspicious cases to undergo a period of observation. Intending passengers who have not had smallpox are required to show that they have been vaccinated not longer than three years or less than twelve days before. At each international airport a doctor must always be available and a room provided for medical examination. Provision must also be made for the isolation of cases at the airport or its vicinity, and arrangements must be made for sending specimens to a laboratory and for necessary disinfection measures. Special precautions against yellow fever are taken in Germany on the arrival of Zeppelins from Brazil, although it is considered very unlikely that that disease could spread in Europe. In Africa, however, there is a danger of the infection being carried from one part of that continent to another and attention is called to the value of the mouse test to determine immunity. This test is in use in British Gambia, the Gold Coast, Nigeria, French West Africa, Brazil, the Belgian Congo and the Sudan.

The disinfection of aeroplanes against mosquitoes is carried out by spraying a mixture of 1 part of a 2 per cent. solution of pyrethrum in paraffin with 4 parts of a 2 per cent. solution of pyrethrum in carbon-tetrachloride. Mosquitoes are killed in 5 minutes when the mixture is used in quantities of 5 cc. for each 1,000 cubic feet. Similar results

are obtained with the same mixture but with no pyrethrum dissolved in the carbontetrachloride. [See also *Bull. of Hyg.*, Vol. 11, p. 217.]

A. J. Collis.

Symes (C. B.). Insects in Aeroplanes. [Annex III to Report of Committee on Yellow Fever, Pan-African Health Conference, Johannesburg, Nov. 20–30, 1935.]—*Quarterly Bull. Health Organisation. League of Nations.* Geneva. 1936. Mar. Vol. 5. No. 1. pp. 79–86. [See this *Bulletin*, 1936, Vol. 33, p. 343.]

Sprawson (C. A.). **The Position of India in Regard to the Yellow Fever Question.** [Annex IV to Report of Committee on Yellow Fever, Pan-African Health Conference, Johannesburg, Nov. 20–30, 1935.]—*Quarterly Bull. Health Organisation. League of Nations.* Geneva. 1936. Mar. Vol. 5. No. 1. pp. 87–88.

In view of the danger to India of the introduction of yellow fever, the author recommends a thorough examination by mouse protection and viscerotome tests of the neighbourhood of all aeroplane stopping-places in the Anglo-Egyptian Sudan, Kenya and Uganda, and further tests to determine the limits of its endemicity. Moreover, the crews of all planes crossing from Africa to India should be vaccinated against yellow fever. *E. H.*

Bana (F. D.). **A Practical Way of dealing with** *Aëdes aegypti* (*Stegomyia fasciata*) **Mosquito Breeding in Country Craft.**—*Indian Med. Gaz.* 1936. Feb. Vol. 71. No. 2. pp. 79–80.

The author calls attention to the prevalence of *Aëdes aegypti* on small craft, particularly sailing ships of several types, which enter Bombay. In less than 2 months he examined 898 of these ships, and found the yellow fever mosquito breeding in 458.

At present it is only possible to empty out the drinking water containers if the master agrees. Statutory powers are required to enforce mosquito proofing, etc. *P. A. Buxton.*

Sellards (Andrew Watson) & Laigret (Jean). Nouvelle démonstration de l'efficacité de la vaccination contre la fièvre jaune. [**A New Demonstration of the Efficacy of Vaccination against Yellow Fever.**]—*C. R. Acad. Sci.* 1936. Apr. 27. Vol. 202. No. 17. pp. 1467–1468.

The authors state that 12,000 persons in French West Africa have been vaccinated by the use of attenuated mouse virus, without a single case of yellow fever having occurred amongst them, although cases have occurred amongst non-vaccinated persons.

A volunteer received a single injection of 15 mouse units in a suspension of brain after 256 passages in mice. Living virus was detected in his blood circulation, but the patient showed no obvious clinical reactions. Seven months later this subject was bitten by 4 infected mosquitoes, *Aëdes aegypti*. Three of these mosquitoes were subsequently fed separately on three monkeys, two of which died of typical yellow fever. The vaccinated person, though bitten by certainly infected mosquitoes, showed no signs of any reaction, a direct demonstration of the efficacy of this method of vaccination. *E. H.*

Nicolle (Charles) & Laigret (J.). Vaccination contre la fièvre jaune à l'aide d'une seule inoculation du virus amaril vivant, desséché et enrobé. [**Vaccination against Yellow Fever by Means of a Single Inoculation of Living Yellow Fever Virus, Dried and Coated.**] —*Arch. Inst. Pasteur de Tunis.* 1936. Jan. Vol. 25. No. 1. pp. 28–39.

A detailed account of the method previously described [see this *Bulletin*, 1935, Vol. 32, p. 880].

In a footnote at the end of their paper, the authors state that in November, 1935, 100 persons had been treated by this method of vaccination in France, and large applications are in progress in French West Africa, the Cameroons and the Lake Tchad region. The method now definitely selected is a single inoculation of dried virus simply "coated" in egg-yolk. *E. H.*

Stefanopoulo (G. J.). Sur la vaccination contre la fièvre jaune. [**Vaccination against Yellow Fever.**]—*Bull. Soc. Path. Exot.* 1936. Apr. 1. Vol. 29. No. 4. pp. 359–360.

A brief statement of the method of procedure in applying serum vaccination (as distinct from Laigret's method) against yellow fever, at the Institut Pasteur, Paris. Up to date 103 persons have been vaccinated and in general the treatment has not produced any very marked ill effects, beyond the usual febrile reactions following any serum therapy in particularly sensitive patients. The only exception is the case described by Mollaret [see below]. Yellow fever virus has never been recovered from the blood of any of the subjects.

E. H.

i. Darré (H.) & Mollaret (P.). Etude clinique d'un cas de méningo-encéphalite au cours de la séro-vaccination anti-amarile. Méningite aiguë avec lymphocytose considérable, modifications de la réaction du benjoin colloïdal, epilepsie, narcolepsie et confusion mentale. Double poussée secondaire d'hypertension intra-cranienne. Guérison sans séquelles. [**A Clinical Study of a Case of Meningo-Encephalitis during the Course of Yellow Fever Serum-Vaccination.**]—*Bull. Soc. Path. Exot.* 1936. Feb. 12. Vol. 29. No. 2. pp. 169–176.

ii. Mollaret (P.), with the collaboration of G. M. Findlay. Étude étiologique et microbiologique d'un cas de méningo-encéphalite au cours de la séro-vaccination anti-amarile. [**An Etiological and Microbiological Study of a Case of Meningo-Encephalitis during the Course of Anti-Yellow Fever Serum Vaccination.**]—*Ibid.* pp. 176–185.

i. A description of the first case of a nervous accident observed in Professor Pettit's laboratory during the course of serum-vaccination against yellow fever dating back to 1933.

The patient, a woman of 25 years, developed nervous symptoms 11 days after the inoculation of horse immune serum and mouse yellow fever virus.

A study of the case showed the presence of an acute meningitis with considerable lymphocytosis, modifications in the colloidal benzoin reaction, epilepsy, narcolepsy and mental confusion, and intra-cranial

hypertension. After three to four weeks the patient recovered without any sequelae.

The authors, after a careful discussion of the symptoms, come to the conclusion that on clinical grounds there is reason to doubt whether this acute meningitis was due to the yellow fever virus, and incline to the hypothesis that a spontaneous mouse virus was present in the material used for the vaccination. [See MARTIN, R., ROUESSÉ, G. & BONNEFOI, A., below.]

ii. A microbiological study of the case referred to above. The vaccine in this case had been used in London for the vaccination of six patients none of whom showed any ill effects. Two months later this vaccine was used in Paris for the vaccination of four patients who after the same incubation period all gave abnormal reactions, including the case under discussion. All showed a marked rise in temperature starting about the 12th day, which was of short duration in two of the cases, of long duration in the other two, and in one of these accompanied by meningitis. In a detailed account of experiments with this vaccine the author brings forward very interesting and suggestive experimental evidence in support of the hypothesis that this meningitis was the result of infection with some adventitious virus present in the brains of the mice from which the vaccine was prepared. The original should be consulted for details, but in view of the variety of neurotropic viruses that have now been discovered in mice, it is not unreasonable to assume that the cases in question may have been the result of an unknown mouse virus capable of being pathogenic to man. *E. H.*

LAIGRET. De l'interprétation des troubles consécutifs aux vaccinations par les virus vivants, en particulier à la vaccination de la fièvre jaune. [**The Interpretation of the Troubles following Vaccination with Living Virus, especially after Yellow Fever Vaccination.**]—*Bull. Soc. Path. Exot.* 1936. Mar. 11. Vol. 29. No. 3. pp. 230–234.

The author discusses the nature of the nervous troubles occasionally observed after vaccination against yellow fever, and mentions that out of at least 12,000 persons vaccinated up to date only 4 of them have shown any nervous reactions and none have been fatal.

The greater part of the paper comprises a polemical discussion of the nature of the case of meningo-encephalitis described by MOLLARET & FINDLAY [*ante*] and their interpretation. The author himself claims to have isolated from yellow fever mice another virus, which is not pathogenic to man, but considers that the danger of such a foreign virus is insignificant in view of their practical results, and once again reaffirms that the inoculation of immune serum merely adds to the inconvenience of treatment and is of no value. *E. H.*

MARTIN (René), ROUESSÉ (Gustave) & BONNEFOI (Antoine). Cent cas de vaccination antiamarile (vaccin Laigret) pratiquée à l'hôpital Pasteur. [**One Hundred Cases of Anti-Yellow Fever Vaccination (Laigret's Vaccine) practised at the Pasteur Hospital.**]—*Bull. Soc. Path. Exot.* 1936. Mar. 11. Vol. 29. No. 3. pp. 295–313. [11 refs.] Discussion pp. 234–238.

A detailed account of clinical observations on 100 patients inoculated with neurotropic mouse virus at the Pasteur Hospital in Paris; the

earlier method of 3 doses of attenuated virus was used in 38 cases, dried and coated vaccine in 59 cases, and the remaining 3 received both kinds of vaccine. The results show that in a number of cases there is a distinct febrile reaction, which in the first method generally appears about 3 days after vaccination, but when coated vaccine is employed does not appear as a rule until 5 to 7 days after the inoculation. The reaction usually was not severe and often was absent, but two cases are described which showed marked nervous reactions although both recovered. Attempts to infect mice from these patients were negative, but the authors bring forward evidence in support of their view that the symptoms were the result of infection with yellow fever virus. Although the nervous symptoms only developed on the 14th day, whilst the usual incubation period of yellow fever is 3 to 6 days, the late recognition of symptoms may be more apparent than real. The failure to infect mice is of little significance for the blood of ordinary cases of yellow fever is rarely infective for more than two or three days. Both patients showed a high titre of yellow fever immunity on the 25th day after vaccination with only a single dose of attenuated virus, another fact which tends to confirm their opinion that these were cases of infection with yellow fever rather than with a spontaneous mouse virus.

In the discussion MOLLARET & LÉPINE both called attention to the uncertainties of these cases. The existence of a spontaneous mouse virus in Paris producing meningitic symptoms in monkeys (Lépine) is considered to support the view that these rare nervous cases developing after yellow fever vaccination are not necessarily due to yellow fever virus [see LÉPINE, P. & SAUTTER, V. Existence en France du virus murin de la chorio-méningite lymphocytaire. *C. R. Acad. Sci.*, 1936, Vol. 202, p. 1624. *Bull. of Hyg.*, 1936, Vol. 11, p. 617]. *E. H.*

LHERMITTE (J.) & FRIBOURG-BLANC. Encéphalo-myélite subaiguë consécutive à la vaccination antiamarile. [**Subacute Encephalomyelitis following Yellow Fever Inoculation.**]—*Rev. Neurol.* 1936. Feb. Vol. 65. No. 2 pp. 391–407. With 14 figs.

In August 1934, a French colonial official, aged 32, was immunized against yellow fever by Laigret's vaccine. He received only the first of the three injections of neurotropic yellow fever virus as the inoculation was followed by a severe reaction with fever, headache and attacks of giddiness : a few days later nervous symptoms developed in the lower limbs, fatigue with loss of power, cramps, a feeling of cold and formication. These all disappeared at the end of three weeks and the patient's history was uneventful till the middle of December at which time, while on tour, he developed dysentery. As the dysenteric symptoms cleared up the former symptoms in the legs reappeared, and rapidly became severe. Walking became difficult, he lost flesh, particularly in the lower limbs, and had difficulty in passing urine and faeces. At the same time there was progressive loss of sensation beginning in the legs and extending to the thighs and later to the forearms. On January 31st, the patient took to his bed and never left it again, for his symptoms gradually progressed till his death in October 1935, exactly 14 months after the yellow fever inoculation. A thorough histological examination of the central nervous system revealed such extensive but scattered islets of myelin degeneration

that the case might well have been one of disseminated sclerosis were it not for the intensity of the vascular lesions in the cord, the flame-shaped ("en flammèches") distribution of certain islets of degeneration together with the extent and degree of the cytolytic changes in the cells of the brain. The clinical symptoms and pathological lesions were thus those of disseminated encephalomyelitis rather than of multiple sclerosis. *G. M. Findlay.*

SAWYER (Wilbur A.). **The Duration of Yellow Fever Immunity after Vaccination and after the Disease.**—Reprinted from *Trans. Assoc. Amer. Physicians.* 1935. Vol. 50. 6 pp. With 4 charts.

The titration results for 144 specimens of serum from 45 persons vaccinated against yellow fever indicate that protective antibody becomes demonstrable one or two weeks after vaccination and rises rapidly for a month or six weeks. Soon after the peak there begins a definite and continuous descent at a steadily decreasing rate and towards the end of the fourth year the mean titre has fallen from between 64 and 128 to between 2 and 8, but the rate of fall has diminished until the curve is almost level. In two cases the serum ceased to protect after two years and one person failed to develop any immunity, but the great majority would seem to be immune for at least four years, some possibly for life. For comparison with the duration of immunity after the natural disease, 69 specimens were collected from 53 persons who had had yellow fever on known dates. The titres of the sera taken within four months of the onset of illness are in a class apart from those examined later. This group of cases was mainly from recent epidemics in Brazil and Colombia, and the height of their titres is very similar to that of vaccinated persons. On the whole, however, the attacks of yellow fever seem to be followed by a higher immunity and a slower fall in protective antibody titre than after vaccination, but there seem to be differences in the effects produced by different strains of virus. The curve of the mean titres of sera of persons having had the disease several years previously, up to 55 years, shows an almost horizontal line between titres of 64 and 16, which confirms the general observation of the past that the immunity following an attack of yellow fever endures, as a rule, for life.

With regard to vaccination, it would seem to be a wise precaution to retest persons every two or three years, and to revaccinate if the protective power of the serum is low or absent. *E. H.*

NICOLAU (S.), MATHIS (M.) & BAFFET (O.). Modification de certaines propriétés d'une souche de virus amaril entretenue pendant près de quatre ans sur cobayes. [**The Modifications of Certain Properties of a Yellow Fever Strain during nearly Four Years in Guineapigs.**]—*C. R. Soc. Biol.* 1936. Vol. 122. No. 17. pp. 203–206. [12 refs.]

A study of the changes observed in the French strain of yellow fever virus after 35 passages in guineapigs. This study started in 1933 and has been continued to the present time.

At first numerous large inclusion bodies were found in the central nervous system of all infected guineapigs when inoculated intracerebrally with either the neurotropic or viscerotropic strain. Towards the 10th passage there was a diminution in their number and eventually

the intranuclear bodies disappeared almost entirely from the neurons, and in certain guineapigs it has been impossible to find a single nerve cell containing yellow fever inclusions, but on the other hand they could always be found in the glial cells.

The incubation period has gradually lengthened from an average of 9·4 days duration from inoculation to death, up to an average of 13 days' duration. *E. H.*

Lloyd (Wray), Theiler (Max) & Ricci (N. I.). **Modification of the Virulence of Yellow Fever Virus by Cultivation in Tissues** *in vitro*. —*Trans. Roy. Soc. Trop. Med. & Hyg.* 1936. Feb. 29. Vol. 29. No. 5. pp. 481–529. With 4 graphs. [29 refs.]

A very detailed account of the changes in virulence undergone by yellow fever virus after cultivation during a period of 21 months and through more than 150 subcultures *in vitro* without any intercurrent animal passage.

Pantropic yellow fever virus has been cultivated for more than 130 subcultures in media consisting of serum-Tyrode solution and minced tissue of mouse embryo, chicken embryo or adult mouse testis. The same strain has been grown also for more than 55 passages in a medium of serum-Tyrode solution and minced adult guineapig testicular tissue, and for more than 20 transfers in the same fluid medium and chicken embryo dermis.

Neurotropic virus of both relatively early and late mouse passage has been cultivated for more than 120 subcultures in serum-Tyrode solution and minced chicken embryo. Neurotropic virus of late mouse passage has been grown for 55 transfers in serum-Tyrode solution and minced mouse embryo, and also for 86 subcultures in Tyrode solution containing minced chicken embryo.

The cultivated strains of pantropic yellow fever virus show consistently a progressive loss of the power to produce yellow fever in *rhesus* monkeys following inoculation. The neurotropic affinities of this virus in mice and monkeys, however, do not seem to increase during cultivation.

A strain of pantropic yellow fever virus grown for 92 subcultures in serum-Tyrode solution containing mouse embryo tissue, when passaged for 30 transfers in *Macacus rhesus* only slowly regained its virulence for monkeys. The increase in virulence was shown by the death of 6 of these 30 monkeys. None of them died of yellow fever encephalitis. Monkeys become highly immunized against yellow fever if inoculated with the pantropic virus cultivated in mouse embryonic tissue, together with human immune serum. Evident serum immunity can be produced by a dose of virus equivalent to 34 minimal lethal doses for a mouse, and human immune serum (titre 128) in a ratio of 0·5 cc. per kilo body weight, completely or nearly completely protects monkeys against the appearance of detectable virus in the circulating blood.

The antigenic power of neurotropic virus of mouse brain origin and cultivated pantropic virus grown in mouse embryonic tissue was found to be approximately the same when tested by inoculation into immune persons. The serum antibody titre with both rises rapidly after inoculation of the virus to reach a peak usually at 2 weeks and falls rapidly to its initial level at about 4 weeks.

The results of the immunization of 26 persons with pantropic yellow

fever virus cultivated in mouse embryonic tissue, in the presence of an existing passive immunity, produced by the concomitant injection of a titrated quantity of human immune serum, are recorded in detail. The reactions following inoculation were minimal or absent. The sera of 13 individuals titrated for protective antibodies during the period from 14 to 28 days after inoculation showed titres ranging from 8 to +256.

This long article should be consulted in the original by all those interested in the subject as it contains details of the technique employed for the cultivation of yellow fever virus and the results obtained with various methods and different strains. *E. H.*

GORDON (John E.) & HUGHES (Thomas P.). **A Study of Inactivated Yellow Fever Virus as an Immunizing Agent.**—*Jl. Immunology.* 1936. Mar. Vol. 30. No. 3. pp. 221–234. With 2 figs. [18 refs.]

The authors inactivated yellow fever virus by means of heat, exposure to ultra-violet light, and the action of formaldehyde, and tested the material by inoculation into both monkeys and mice. In no instance was any demonstrable immunity produced by inactivated virus and when immunity did occur it was the result of a demonstrated infection. Neither a solid nor a partial immunity followed the parenteral injection of large amounts of inactivated virus, either of the viscerotropic or neurotropic form. *E. H.*

LLOYD (Wray) & MAHAFFY (A. F.). **Yellow Fever Virus Encephalitis in African and Asiatic Monkeys.**—*Amer. Jl. Trop. Med.* 1936. Jan. Vol. 16. No. 1. pp. 73–75. [14 refs.]

A record of the production of experimental yellow fever virus encephalitis in one *Macacus cynomolgus*, one *Cercopithecus tantalus*, two *C. mona*, and two *Erythrocebus patas*. All these monkeys were inoculated in the left frontal lobe with 0·5 to 1·0 cc. of a Berkefeld N filtrate of the brain of a mouse infected with neurotropic yellow fever virus after more than 200 passages in mice.

The monkeys died of encephalitis after 6 to 9 days and at death virus was isolated from the brain, and either the sciatic or the ulnar nerve, and also, with one exception, the adrenal. It was absent from the blood, cerebrospinal fluid and general viscera of those monkeys examined. All these animals are thus shown to be highly susceptible to neurotropic yellow fever virus. *E. H.*

MOLLARET (Pierre). **Le traitement de la fièvre jaune.**
This book was reviewed on p. 569.

MISCELLANEOUS.

JAMAICA. **Report of the Bacteriological and Pathological Laboratory, 1935** [EVANS (K. Leigh), Govt. Bacteriologist & Pathologist]. 3 typed pp. 1935. Kingston.

The work of the laboratory as reported by Dr. K. Leigh Evans has increased by nearly 50 per cent. in the total of specimens dealt with, but these practically all were in connexion with routine clinical pathology. Of the 39,566 specimens examined 22,634 or 57·2 per cent. were from the General Hospital, 3,440 or 8·7 from Health Officers and 2,958 or 7·4 per cent. from private practitioners. For diagnosis of syphilis the Kahn test is employed, and the number of sera tested was nearly double that of the preceding year, 15,366 in place of 8,842. The sera of all patients admitted to the Public Hospital, Kingston, are tested as a routine measure and nearly half (43 per cent.) gave a positive reaction. Tests were also carried out on placental blood of patients in the Maternity Hospital, 1,166 in all. Comparative tests were undertaken in the latter part of the year with placental and venous blood. Of 218 so tested, 52 were positive in blood taken by venepuncture of which 20 were negative with placental blood; in one instance only did the reverse obtain.

Next in order came Widal tests for enteric fever; these also have nearly doubled, from 2,526 to 4,869. Between 44 and 45 per cent. were examinations for agglutinins to the *Bact. paratyphosum*, such being carried out on all those negative to *Bact. typhosum* whose smears revealed no malaria parasites [why those negative to *Bact. typhosum* but showing malaria parasites should not be tested is not stated; perhaps time could not be spared for this. Information of value might, however, accrue for the combination of enteric fever and malaria may in some cases be very mild, in fact so mild clinically as to escape observation; see this *Bulletin*, 1920, Vol. 15, p. 252]. Of nearly eleven hundred sera tested, only 8 were positive for *Bact. paratyphosum A* and 4 for *Bact. paratyphosum B*.

Blood examinations for malaria parasites totalled 4,478 as compared with 2,250 in 1934. About one-third of these were in connexion with the work of the Malaria Commission. In addition those sending up sera for Widal tests were asked to send at the same time blood smears in order that malaria parasites might be looked for; nearly one in three was positive; in 1934 one in four.

The work of the laboratory staff was further increased by examinations of serological and bacteriological character necessitated by the opening in October of a Women's Clinic for Venereal Diseases.

Lastly, experiments have been undertaken for the cultivation of *Mycobacterium tuberculosis* from sputa microscopically negative on Holmes's modification of Jensen's egg-potato medium. *H. H. S.*

MANSON (D.). **The Scope of an Assam Tea Garden Laboratory.**—*Indian Med. Gaz.* 1935. Dec. Vol. 70. No. 12. pp. 690–693.

The expenses in running a tea-garden in Assam are great, while for the good of the employees a medical laboratory is an essential; nevertheless, costly apparatus cannot be acquired and this account of what can be done in the way of routine investigation at small cost is worth placing on record. Where even this could not be afforded

by the owners of a small garden, several might club together to establish a laboratory in common. The author had three assistants, one qualified and two of the compounder class trained in the laboratory. During the past 5¼ years there has been an annual average of 2,660 blood slides examined for malaria, of which 24·1 per cent. were positive, malignant tertian predominating. In the same period of 5¼ years 24,187 anophelines have been dissected and an infectivity survey made which showed that *A. minimus* was the only important vector. Widal reactions with members of the enterica group have proved very useful to correct diagnosis and the consequent treatment of cases of fever; other routine examinations included faeces for helminthic infestation and for bacterial isolation, and sera for syphilitic infection. Finally, when in 1934 Assam was visited by a widespread epidemic of measles, serum was obtained at the laboratory from convalescents and administered to a large number (285) of contacts; only three later contracted the infection. *H. H. S.*

ALVES (William D.). **"O" Agglutinins for *B. typhosum* in an Uninoculated Native Population.**—*South African Med. Jl.* 1936. Jan. 11. Vol. 10. No. 1. p. 6.

——. **T.A.B. and Brucella Agglutinins in an Uninoculated Native Population.**—*Ibid.* pp. 7–8.

——. **"Normal" Agglutinins and their Bearing on the Diagnosis of Typhoid Fever by Agglutination Tests.**—*Ibid.* pp. 9–10. [11 refs.]

[Summary appears also in *Bulletin of Hygiene.*]

In the first of these papers the author records the O agglutinin titre for *Bact. typhosum* in 300 sera obtained from natives of Southern Rhodesia, none of whom appeared to be suffering from typhoid infection, and none of whom had been previously inoculated. The results of these tests are summarized in Tables I and II.

TABLE I.

No. of sera	Negative	Percentage Positive 1/50	1/125	1/250	1/500	Total Percentage Positive
300	255	9·33	2·67	2	1	15

TABLE II.

Sex	No. of Sera	Positives 1/50	1/125	1/250	1/500	Total Percentage Positive
Male ...	174	16	6	3	1	14·92
Female ...	126	12	2	3	2	15·08

The second paper records the frequency of flagellar agglutination, at various titres, against *Bact. typhosum*, *Bact. paratyphosum A*, and *Bact. paratyphosum B*, among a sample of 530 natives, also non-infected and non-vaccinated. A similar survey of 1,050 sera for agglutinins against *Br. abortus* is included in the tabulated figures (Table I [III]).

TABLE I [III].

Bacterial suspension	No. of sera	Percentage Positive Titre 1/50	1/125	1/250	1/500	Total percentage positive
Bact. typhosum	530	5·1	3·8	2·2	1·5	12·6
Bact. paratyphosum "A"	530	—	—	—	—	—
Bact. paratyphosum "B"	530	—	—	—	—	—
Br. abortus	1,050	0·1	—	—	—	0·1

In the third paper the author discusses, in the light of these findings, the criteria that should be adopted in interpreting diagnostic agglutination tests for enteric infection in Southern Rhodesia, emphasizing the essential point that such criteria can be laid down only when the level of "normal agglutinins" among the general population in the locality concerned is accurately known.

[Surveys of this kind are of the greatest value, both from the practical point of view, emphasized by the author, and as an indication of the relative frequency of different types of enteric infection in different parts of the world.] *W. W. C. Topley.*

Yu (H.). **The Serum Treatment of Typhoid Fever.**—*Chinese Med. Jl.* 1936. Feb. Vol. 50. No. 2. pp. 159–164.

The author prepared the serum to be used according to Felix's technique, injecting 1 cc. of dried *Bact. typhosum* extract daily into a horse for 3 days, pausing for 4 days, then injecting 1 cc. of living organisms intravenously for 3 days and again resting and so on with increasing doses for 10 weeks. The agglutinin titre was then 1 in 25,600 and the animal was bled. The dosage used for treatment was 2–4 doses of 20–50 cc., and the patients selected were those in an early stage of illness, as soon as the diagnosis was certain, *i.e.*, patients with clinical symptoms of enteric fever, proved by positive Widal and blood culture. Fifteen such patients were treated; 8 showed definite improvement—fall in temperature and diminution of toxic symptoms; 2 showed reduction of toxaemia but no fall in temperature; 5 appeared to be unaffected. Four others were given serum received from Dr. Felix; they were given rather smaller doses. Two showed "dramatic improvement," one was unaffected, the other showed an improvement in the toxic symptoms. The method is worthy of further trial.

H. H. S.

Brug (S. L.). Tropische ziekten, die niet in Nederlandsch-Indië voorkomen.—*Geneesk. Tijdschr. v. Nederl.-Indië.* 1936. Feb. 4. Vol. 76. No. 5. pp. 259–271.

Kuo (K. W.), Takahara (K.), Adachi (J.) & Saito (K.). **Sweating with Heat Stroke.**—*Jl. Oriental Med.* 1935. June. Vol. 22. No. 6. [In Japanese pp. 1147–1159. With 5 charts. [15 refs.] English summary pp. 98–99.]

An account of an investigation to determine the relationship between suppression of sweat and the development of heat stroke. The subjects

of the experiments were four healthy young men in whom heat stroke was produced on 16 occasions by exposure to dry bulb temperatures of from 40° to 72°C., and wet bulb temperatures of from 38° to 48°C. The observations were begun at ordinary room temperature, and the subjects were then suddenly introduced into a hot chamber where they remained until their condition became dangerous, or until acute discomfort made it impossible to continue the exposure. Within a few minutes of entering the hot chamber the rectal temperature commenced to rise, at first slowly, but soon with increasing rapidity until the maximum height of 39·5°–40·8°C. was reached. Sweating of the chest and axilla was produced immediately on entering the hot chamber, moderate in amount for the first 5 minutes, but increasing enormously and approaching the maximum during the following 15 or 20 minutes. With the onset of stupor, the sweating decreased abruptly and approached suppression, and at this stage the condition of the subjects became so critical as to compel the breaking off of the experiment. On returning to cool air, the sweating suddenly recommenced (although the rectal temperature still remained high) and then diminished gradually. Such a suppression of sweat occurred in 7 out of 16 experiments, and was found when the subject was about to fall into a condition of stupor. From this experiment the authors conclude that suppression of sweat has no causal significance in the production of heat stroke, but is merely a phenomenon which occurs in heat stroke of a severe degree. *W. P. MacArthur.*

Lee (Douglas H. K.). **The Human Organism and Hot Environments.** —*Trans. Roy. Soc. Trop. Med. & Hyg.* 1935. June 29. Vol. 29. No. 1. pp. 7–20. [38 refs.] Discussion pp. 20–30.

The author describes four crises which occur in physiological reactions to heat: (1) Hyperpyrexia; (2) Circulatory Insufficiency; (3) Electrolyte Inbalance; (4) Super-Dehydration. The clinical syndromes which respond respectively to the foregoing are: (1) True Heat Stroke; (2) Heat Exhaustion; (3) Heat Cramps; (4) Dehydration.

Electrolyte Inbalance is defined as the lowering of the serum chloride concentration to 100 m.equ. (mille equivalent) per litre (=365 mgm. per 100 cc.), or less. As has often been pointed out, the hypochloraemia is due primarily to replacement of the water lost in sweating without simultaneous replacement of the chloride.

Super-dehydration is defined as loss of water from the body to such an extent that continued existence is threatened, should replacement not be effected. The critical point probably lies at about 20 to 25 per cent. of the body weight. Super-dehydration, among other results, brings about impairment of circulation and this in turn produces disordered metabolism, disordered nervous function and diminished heat loss. Through disordered metabolism an acidaemia is set up with further damage to the nervous system which may be affected still further by rise of temperature. Nervous disturbances become increasingly manifest and may finally pass into coma and death.

Although a large number of cases belong to one category by virtue of the great majority of symptoms, a good deal of overlapping between syndromes in any one case is probable owing to the diversity of climatic heat elements involved, and the wide range of reaction possible in the human subject. *W. P. MacArthur.*

Beckett (H. E.). **Efficacy of Aluminium Paint for Exclusion of Solar Heat.**—*Jl. Inst. Heating & Ventilating Engineers.* 1935. Nov. Vol. 3. No. 33. pp. 414–417. With 1 fig. [Summary appears also in *Bulletin of Hygiene.*]

In recent years aluminium paint has been used as a protection against over-heating by the sun on the tops of omnibuses, ambulances and other small enclosures. The research described shows that white paint is considerably better for this purpose than the particular make of aluminium paint used in the course of this research. It was also shown that aluminium paint should make a better finish for the insides of such roofs than the white paint normally used.

Wooden boxes, 3 ft. 7 ins. square and 1 ft. deep were exposed to the sun. The boxes were covered with tinplate, one side or both sides of which were treated with the paints under consideration. The results were expressed by the relative temperature excess of the plates inside the box over the outside air. Taking the temperature excess where both surfaces of the tinplate cover were painted black as 100, it was found that aluminium paint outside and white paint inside gave 66, whereas white paint outside and aluminium paint inside gave 19. The loss of petrol from cans painted with aluminium paint and with white paint, the cans having small apertures in their tops, gave results concordant with those found with the covered boxes.

T. C. Angus.

Beek (F. J. Ch.). Een geval van de ziekte van Selter-Swift-Feer. [**A Case of Selter-Swift-Feer Disease.**]—*Geneesk. Tijdschr. v. Nederl.-Indië.* 1935. Oct. 29. Vol. 75. No. 22. pp. 1904–1909. [Summary appears also in *Bulletin of Hygiene.*]

The eponymous nomenclature attached to the disease which is here considered, covers that which is known very variously as trophodermatoneurosis, vegetative neurosis of the child, acrodynia, pink disease, erythroedema polyneuritis and vegetative nervous system-paralysis of children. It is a rare disease and merits record, but once seen is easily diagnosed thereafter. The symptoms in the author's case, a child of 6½ years, began after swimming; they were typical except for oedema and an eosinophilia, which might have been due to oxyuriasis.

This disease is one which usually makes its appearance between the ages of 6 months and 4 years. The first symptoms are psychical and involve change of character, loss of interest in surroundings and peevishness. These are soon succeeded by myasthenic symptoms; the child is first unable to stand and then to sit, he cannot even hold up his head. Paraesthesiae, such as formication and the feeling of burning in the palms and soles develop. Itching is a marked feature and there is a redness of the extremities due to vasodilatation ("Pink disease"). A very marked symptom is the sweating from which the child suffers and erythematous eruption. Symptoms are permanent, but may undergo paroxysmal exacerbation. One feature of the disease, tachycardia, is practically never absent and the pulse may be 140 to 180. Other symptoms are polycythaemia, which may be due to the dehydration of sweating, photophobia, salivation, bleeding from nose and gums, loss of hair and sometimes gangrene. No alteration occurs in the cerebrospinal fluid. There may be slight hyperglycaemia, some diminution of blood phosphate and slight glycosuria.

Various clinical forms are distinguished—psychic, clonic, paralytic, hyperaesthetic, and eruptive (morbilliform or scarlatiniform).

Little is known of the aetiology and contagion seems ruled out, but an epidemic character may prevail. As causes, a neurotropic virus and vitaminic deficiency are incriminated. Yeast and irradiated ergosterol have produced benefit and again the still unknown factor may be contained in raw liver. The same syndrome has been reproduced in young rats on a full vitamin diet but with white of egg as the only protein. Raw liver can cure the rats directly.

Little is known of the pathology of the disease, for the patient usually recovers. Lesions are found in the adrenals, pituitary, anterior and posterior horns of the spinal cord and in different ganglia. [See *Bulletin of Hygiene*, 1933, Vol. 8, p. 551; 1936, Vol. 11, p. 38.]

W. F. Harvey.

DALE (W. C.). **" Zipp " Treatment of Ulcers.**—*West African Med. Jl.* 1935. Nov. Vol. 8. No. 4. pp. 16–17.

A method which gives promise of reducing time and expense in the treatment of ulcers in the tropics is worth an extensive trial. The author reports success with the use of " Zipp " (zinc oxide and iodoform each 1 part, soft yellow paraffin 2 parts). It seems to heal rapidly almost all forms of chronic ulcer except those with circular outline and clean cut edges which are very likely syphilitic. The method of application is given in the following words :—

" The ' Zipp ' is spread thickly on three or four thicknesses of gauze, cut to a size to cover completely the whole ulcerated surface. This is pressed evenly on to the part affected. Then a bandage made of several thicknesses of gauze is bound evenly and fairly firmly over it. The object of this is to absorb the discharge from the ulcer. Then a plaster of Paris bandage is applied firmly. The gauze prevents any undue pressure from the plaster."

If possible the dressings should be left for 3 weeks or even longer, by which time the ulcer may be found healed. If there is sloughing, the bandage may need taking down and a new one being applied after a week, at all events as soon as any discharge appears on the surface of the plaster, or tracks down below the lower end of the plaster. Four cases are detailed and reference is made to others in whom ulcers of over a year's duration cleared up after 2 or 3 applications ; among them is a boy with an ulcer exposing the bones about the ankle whose condition healed without impairment of movement.

Dr. BEAUGIE of the Wesley Guild Hospital, Ilesha, also reports very favourably upon the method, but he uses the ingredients in the proportions of 2, 1, 3 instead of 1, 1, 2, thus having a smaller proportion of iodoform, and he finds strapping as serviceable as plaster of Paris bandages.

H. H. S.

FUSCO (G.) & CHIONETTI (U.). Il trattamento dell' ulcera tropicale con la bile. [**The Bile Treatment of Tropical Ulcer.**]—*Arch. Ital. Sci. Med. Colon.* 1935. Nov. Vol. 16. No. 11. pp. 816–818.

The ways suggested for treating tropical ulcer are legion ; they may be grouped under five heads : general such as dietetic and tonic, local application of drugs, surgical methods, physical as by congestion, pressure, light, and specific as by vaccines. In Italian Somaliland

tropical ulcer is very prevalent, some 10 per cent. of the native population being affected. The bile treatment is in essentials a form of vaccine. The use of bile in reducing virulence of organisms is a widely held belief, and the author's idea is that by local application of bile the organism or organisms responsible for the ulcer are reduced in virulence but thereby lose none of their antigenic powers, in other words the bile brings about vaccination by living organisms of lowered virulence. The ox-bile is heated in a water-bath at 100°C. for 10 minutes ; when cool it is applied drop by drop on the ulcer, and the wound covered with an ordinary bandage. The application is made daily or on alternate days. Cure, it is said, takes place in a few days with an average-sized ulcer and in 20–30 days in the more severe. The pain is eased as a rule after the first application. *H. H. S.*

Escomel (E.). Gastro-entéro-côlite produite par l'ingestion du *Tyroglyphus farinae.* [**Gastro-enteritis due to** *Tyroglyphus farinae.*]—*Bull. Soc. Path. Exot.* 1935. Oct. 9. Vol. 28. No. 8. pp. 715–717. [Summary appears also in *Bulletin of Hygiene.*]

The author was called to attend a woman who was suffering from intense abdominal pain, accompanied by nausea, profuse diarrhoea, and great prostration. There was marked tenderness in the abdomen. Examination of the stools revealed large numbers of arthropods which proved to be acarids in various stages : adult females 650 by 320 μ, adult males 350 by 160 μ, nymphs 200 μ long and eggs, double-contoured, 50 by 60 μ. They proved to be stages of *Tyroglyphus farinae.* This parasite has been found in damaged flour, in muscovado (unrefined) sugar, in dried raisins, almonds, cheese, etc. The cause in the case described was dried raisins. The best treatment was elimination by means of a purgative of an oily (not saline) nature, such as liquid paraffin, other treatment being sedative for the pain and gastric distress, *e.g.*, bismuth and opium. The parasite is said to exert its action partly by mechanical irritation and partly by a poison which it secretes or excretes. *H. H. S.*

Hameed (Abdul). **Eosinophilia of Undetermined Origin.**—*Jl. Indian Med. Assoc.* 1935. Dec. Vol. 5. No. 3. pp. 99–100.

A puzzling case is recorded. A man of 30 years, a Madrasi, was admitted to hospital on account of " fever of four days' duration." No diagnosis was made, but the patient was discharged as cured five days later. After an interval of six weeks he was again admitted " for fever " and discharged cured after 4 days. Again no diagnosis was reached. History and physical signs were negative, except for a very high degree of eosinophilia with leucocytosis. He had never had asthma or any skin disease, there were no tubercle bacilli found in repeated examination of the sputum, no signs of any helminthic infestation. Nevertheless, though the erythrocytes were little reduced, the number varying between 3,400,000 and 4,680,000 per cmm., the white cells ranged between 31,300 and 50,000 of which polymorphonuclears constituted 5–19 per cent., lymphocytes 8–18 and eosinophiles up to 87 per cent. and never below 69 per cent. The author is keeping the patient under observation and future developments will be of interest. *H. H. S.*

ROBERTS (J. Isgaer) & TONKING (H. D.). **Notes on an East African Vesicant Beetle, *Paederus crebripunctatus* Epp.**—*Ann. Trop. Med. & Parasit.* 1935. Dec. 18. Vol. 29. No. 4. pp. 415–420. With 1 fig.

The vesicating beetle *Paederus crebripunctatus* increases to enormous numbers in Kenya after seasons of heavy rainfall. The insect is known to the European population as " Nairobi eye " on account of the conjunctivitis produced when the juices of crushed insects are rubbed into the eye. The toxic juices are set free only when the beetles are crushed. The active principle, cantharidine, is not destroyed by heat or desiccation. Notes on treatment are given ; greasy applications should be avoided ; compresses of magnesium sulphate give immediate relief. *V. B. Wigglesworth.*

MURRAY (Ian). **" Secondary " Pellagra.**—*Glasgow Med. Jl.* 1936. Feb. Vol. 125. No. 2. pp. 49–58. [14 refs.]

An account of two cases of secondary pellagra under care in the Victoria Infirmary, Glasgow. The first was a girl aged 19 with signs of enlargement of the liver and spleen, an undetermined affection of the heart, fluid in the right pleura, who while under observation developed the signs upon which a diagnosis of pellagra was made—symmetrical pigmentation and roughening of the skin of the backs of the hands, wrists, big toes, inner aspects of the calves and thighs, associated with diarrhoea, hypochlorhydria and anaemia. She improved sufficiently, though the hepatic and splenic enlargement remained, to allow of her discharge from hospital. Three months later she died suddenly. No necropsy. The second patient was a man aged 57, shown as a " case for diagnosis " in March 1935, who exhibited a chronic symmetrical exfoliative pigmented dermatitis with hyperkeratosis of the ears, backs of the hands, fingers, toes and elbows with discoloured and ridged finger nails, associated with marked constipation, a moist furred tongue, epigastric discomfort, occasional vomiting and marked gastric hypoacidity. The knee-jerks were increased, he had lost a stone in weight and he was melancholic ; there was marked anaemia and the liver was palpable. He complained of burning and itching in the hands. The skin lesions were thought to improve after the exhibition of marmite. In May jaundice developed with vomiting of blood and blood in stool and fatal issue. Post-mortem examination revealed a carcinoma of the head of the pancreas. *H. S. Stannus.*

KOURÍ (Pedro) & BASNUEVO (José G.). Un caso autoctono de coccidiosis humana. Tratado por el violeta de genciana. [**An Indigenous Case of Human Coccidiosis.**]—*Rev. Parasit., Clin. y Lab.* Habana. 1936. Jan.–Feb. Vol. 2. No. 1. pp. 97–98. With 3 figs. on 1 plate.

In December 1935 the patient was sent to the authors with a history that his doctor had made three examinations of his stools at intervals of several days and had found numerous oöcysts of *Isospora hominis*. The patient was put on a diet of milk and vegetables, and two further examinations at two-day intervals confirmed the previous findings. He was given Anguilucide, *i.e.* Gentian violet, 3 capsules daily each of 0·05 gm., one with each meal. In 3 days' time, when he had taken

45 cgm. of the dye, the stools were examined and found negative; the same was observed 3 days later, when he had taken 90 cgm. Treatment was stopped and three further examinations at 5-day intervals were all negative. It is believed, therefore, that the patient has been cured, but he is to be kept under observation. *H. H. S.*

Piot (M.). La nature du poison du lupapi. [**The Toxic Principle in Lupapi.**]—*Ann. Soc. Belge de Méd. Trop.* 1935. Dec. 31. Vol. 15. No. 4. pp. 529–536.

The Lupapi or, locally, Mweyeye, is the root of *Securidaca longepedunculata* Fres. It is employed by natives of the Congo as an analgesic, a purgative, to hasten labour, and occasionally suicidally by introduction *intra vaginam*. Vleurink thought that the poisonous principle was methyl salicylate; it has a strong odour of this when fresh. Others, however, have recorded the presence of a toxic saponin soluble in water.

The author's experimental work has been carried out with a powder of the roots collected late in the dry season, August–September. The act of pulverizing in a mortar brought on uncontrollable sneezing and an irritation of the hands. A watery extract when lightly shaken becomes covered by a froth which persists for hours. It contains a saponin (or more than one) and a little methyl salicylate. Injected intraperitoneally into guineapigs in doses of 1 cc., subcutaneously 3–4 cc., and into a rabbit 5 cc. intravenously, it produced, in the former, signs of severe pain for an hour or more; the rabbit showed no symptoms when watched for an hour, but next day all the animals were found dead and there was evidence of very severe diarrhoea. At autopsy, the whole gastro-intestinal tract was congested, the peritoneum injected and containing blood-stained fluid. Those injected subcutaneously showed local oedema and a gelatinous condition of the adjacent muscle. Repetition of experiments showed 0·5 cc. of the macerated extract was fatal for 600 gm. guineapigs.

Haemolytic properties were tested on rabbit's blood with Merck's saponin for comparison; it proved to be a little weaker than the latter; all the haemolysing substance, however, was not fixed by cholesterin (as are those of most saponins). An alcoholic extract of the root is toxic, but not if the extraction is done on an aqueous extract; in other words the watery extract removes all the poison.

We can now see the rationale of the uses to which the natives put this plant: 1. As an *analgesic for headache*. They make small incisions in the skin of the forehead and dust on the powdered root. The local irritant effect is severe and may thus affect the cerebral circulation. 2. As a *purgative*. A small piece is placed in a glass of cold water for a few minutes and the fluid drunk. This produces stimulation of the intestines and irritation of the mucosa. 3. In *prolonged labour* or *retained placenta*, the infusion is taken as for a purgative. The reason why fatal results do not usually follow the drinking of the infusion is that nearly all saponins are decomposed by the gastric juice and thereby have their activities much reduced if not annulled. 4. With *suicidal intent*, a woman powders the root, makes it into a thick paste with a little water and introduces it into the vagina. Absorption takes place and the saponin is able to exert its toxic action.

H. H. S.

Simpson (I. A.). **A Poisonous Variety of Star Anise.**—*Malayan Med. Jl.* 1935. Dec. Vol. 10. No. 4. pp. 140–141.

The author reports another case of poisoning by *Illicium religiosum*, taken in mistake for the non-toxic variety *I. verum*. The latter, one of the Magnoliaceae, is indigenous to south-eastern Asia and is widely cultivated in Southern China, Japan, the Philippines and in the West Indies (Jamaica) ; it is used for flavouring curries, etc. To the ordinary person the distinctions between the toxic and the harmless species are not very marked—details of differentiation are given in the article, and the chief are that in the fruit the carpels of the non-toxic are unequal, longer, and the summit acute and terminating by a nearly straight beak, whereas in the toxic they are mostly equal, shorter but wider and the summit ends in a short curved beak. The outer surface is much rougher in the toxic variety ; the seed is less compressed and has no evident raphe, the taste is pungent and bitter and the odour resembles oil of cajuput or cardamom, whereas the non-toxic seed has a narrow raphe and odour and taste of anise.

The patient was a Tamil of 28 years who drank some milk with some of the powdered vegetable substance. In half an hour he vomited, became convulsed and died in coma within 24 hours. The only post-mortem changes were ecchymotic patches in the gastric mucosa and marked congestion of lungs and kidneys.

[Scott gives the following reference to *Illicium religiosum* and poisoning by it in Byam & Archibald's Practice of Medicine in the Tropics (Vol. 1, p. 779) :—

"This plant resembles the star anise (*Illicium anisatum*) and goes by the name of 'Badiane' in China and Japan where it grows in the neighbourhood of temples and burying grounds.

"In the Philippines a decoction, denominated 'sanki,' is made from the fruit and is used for its stimulating effects.

"Cases of poisoning both by the *I. anisatum* (less commonly) and by the *I. religiosum* have been reported from the Philippines, Cochin China, and Japan. The *I. anisatum* variety is used medicinally, but the *I. religiosum*, being cheaper, is often substituted for the former and is much more poisonous.

"*Symptoms.* Repeated vomiting, the vomitus in some cases showing streaks of blood, diarrhoea, convulsions with loss of consciousness ; during the fits there is cyanosis of the features with cessation of respiration, retraction of the head and dilated pupils. Pains in the head and cramps in the limbs are also complained of ; there may be profuse sweating, diminution to actual suppression of the urine, marked thirst, and insomnia."] *H. H. S.*

Raymond (W. D.). **The Composition and Examination of Tanganyika Arrow Poisons.**—*Analyst.* 1936. Feb. Vol. 61. No. 719. pp. 100–103.

This paper deals with the chemical and analytical aspect of arrow poisons used in Tanganyika, the plants used belonging to Acocanthera, Strophanthus and Adenium. The method of obtaining the toxic principle is given and a table with the differentiating colour reactions. [The actions of these poisons are not always, indeed not often, clear-cut and experimental work only in part explains them, because it is rare for a single poison to be used. For example, several species of Acocanthera may be employed : *A. schimperi* (ouabain), *A. deflersii* and

A. venenata and to the extract which contains the glucoside ouabain other vegetal extracts may be added and sometimes snake venom. The root is generally used and the toxin is a potent one, killing in a few minutes by arresting the heart's action, after causing rapid, laboured breathing and convulsions; if made from the bark, the poison causes similar symptoms, with loss of muscular power but without convulsions.] *H. H. S.*

Wolff (E. K.) & Austin (L. D. C.). **Preservation of Pathological Museum Specimens under Tropical Conditions.**—*Ceylon Jl. Sci.* (Sect. D. Med. Sci.) 1935. Dec. 3. Vol. 3. Pt. 4. pp. 243–247. [Summary appears also in *Bulletin of Hygiene.*]

Preservation of pathological specimens is a puzzling problem in the tropics, especially when there is a desire to conserve the colours. Kaiserling, Jores, Pick and other fluids all have their drawbacks and at times prove unsatisfactory. The authors have tried to determine what factors are responsible for preservation of the colours of tissues, and found that none of the ingredients of Jores could be omitted. The reaction of the fluid, however, was found to vary, and they prepared a neutral fixative by adding finally sufficient $NaHCO_3$ to produce a fluid with pH 7·0–7·2. The composition was: Sodium sulphate 220 gm., sodium chloride 90 gm., potassium sulphate 10 gm., chloral hydrate (saturated solution) 500 cc., formalin 2,000 cc., water 10,000 cc., and sodium carbonate to neutrality (20–80 gm.). Even this did not remain neutral in the presence of organic matter, and the specimens after a time turned brown, but less if there was plenty of blood. Fresh ox blood was added, therefore, but while retaining the red of the haemoglobin pale tissues (*e.g.* brain) became yellow. Substitution of blood serum, 10 cc. to every 100 cc. solution for the ox blood has proved very satisfactory, especially if watch is kept on the reaction and $NaHCO_3$ added when the pH falls below 7·0. It keeps for a long time, and when it is failing can be restored by occasional addition of chloral and formalin. Care must be taken to see that the fixative penetrates well. For mounting, a 3 per cent. NaCl in distilled water proved satisfactory; the crude salt may be used, and a 35 per cent. solution is saturated; this is repeatedly filtered, cleaned with animal charcoal and refiltered. It is kept in this strength as stock and diluted as required. Any tendency to blueness is counteracted by adding a few drops of 2 per cent. potassium bichromate solution. The whole is sealed with "Aquatex," or a compound of asbestos powder, pitch and linseed oil.

The steps are summarized as follows:—

"1. The specimens are carefully prepared and dressed.

"2. They are hardened in neutralized and buffered fixing solution for one to seven days.

"3. They are next washed in running water for three to twenty-four hours.

"4. If necessary they are placed in rectified spirits to improve the colour.

"5. They are passed through several changes of 3 per cent. sodium chloride solution.

"6. They are finally mounted in 3 per cent. sodium chloride solution, thymol-menthol-benzine solution sprinkled on the surface of the mounting fluid and the jar closed air tight with Aquatex."' *H. H. S.*

Castronuovo (Giovanni). Epatosplenomegalie tropicali ed egiziane.—*Riforma Med.* 1935. Nov. 23. Vol. 51. No. 47. pp. 1793–1795.

Poggi (Igino). Contributo all'anatomia patologica dell' ainhum.—*Arch. Ital. Sci. Med. Colon. e Parassit.* 1936. Feb. Vol. 17. No. 2. pp. 115–120. With 4 figs.

Smith (Harry S.). **The Rôle of Biotic Factors in the Determination of Population Densities.**—*Jl. Economn. Entom.* 1935. Dec. Vol. 28. No. 6. pp. 873–898. With 5 figs. [16 refs.]

The paper is of a theoretical nature. It considers an idealized population of insects and studies the complex factors which may affect that population at different densities.

The author draws a clear distinction between those factors which affect the population of insects to a constant extent and those other factors, the effect of which is increased (or decreased) as the density of insects increases. The factors in the first group, those independent of density, are mainly climatic: for instance a drought or a frost may be assumed to kill the same proportion of an insect population whether it be sparse or dense; such a factor cannot for long affect the density of population because it will increase rapidly to a state of equilibrium. It is only the factors which are dependent on the density that can make a permanent effect upon the equilibrium of the population: these factors are mostly biological and they include such things as the effect of parasites and predators and the competition which may exist between individuals of the population which is being studied.

The paper is perhaps hardly suitable for abstraction, but it is an important one, helping us to understand some of the laws of increase of population, a subject fundamental to applied entomology.

P. A. Buxton.

Roman (E.). Le problème hygiénique des moustiques urbains. [**Urban Mosquitoes and Public Health.**]—*Rev. d'Hyg. et de Méd. Préventive.* 1936. Feb. Vol. 58. No. 2. pp. 102–112.

The author discusses the nuisance caused by urban mosquitoes in French cities and the special problem of control.

It appears that only two species of mosquito need be considered. Of these the Yellow Fever mosquito (*Aëdes aegypti*) is of minor importance and confined to the south of France. The common brown *Culex pipiens* is widely distributed and a serious nuisance to the inhabitants of most towns and cities. In urban areas the representatives of this mosquito belong to the autogenous race, which can lay eggs without a blood meal, but bites man readily and breeds in heavily contaminated waters. The early stages may be found in a great variety of places, among which sewers, cess-pits, pit privies and blocked drains are important. The problem of reducing this mosquito, which is discussed at some length, is very difficult because of the existence of many potential breeding places and the need for recurrent attention to them.

P. A. Buxton.

Weyer (Fr.). Einige Erfahrungen bei der Aufzucht von Stechmückenlarven. [**Practical Rearing of Mosquito Larvae.**]—*Zent. f. Bakt.* I. Abt. Orig. 1936. Feb. 13. Vol. 136. No. 1/2. pp. 111–116. With 2 figs.

Hay infusion is very satisfactory for the rearing of *Culex pipiens* and *C. fatigans*. For Anopheles larvae (*A. maculipennis*) the best results have been obtained with water containing a rich culture of saprophytic algae. If a little powdered liver or other animal substance is added to water containing such algae these grow rapidly. They provide abundant food for the larvae and at the same time keep the water thoroughly aerated so that it need not be changed.

V. B. Wigglesworth.

Freeborn (Stanley B.) & Berry (Lester J.). **Color Preferences of the House Fly,** *Musca domestica* **L.**—*Jl. Econom. Entom.* 1935. Dec. Vol. 28. No. 6. pp. 913–916. With 1 fig.

It is a common practice among California dairymen to use aluminium paint on the walls as a repellent for house flies. Experiments in which a chequer board of coloured squares was set up in the dairy barn showed that aluminium paint has no particular value as a fly repellent. The flies prefer dark colours and rough surfaces.

V. B. Wigglesworth.

Williams (C. B.) & Milne (P. S.). **A Mechanical Insect Trap.**—*Bull. Entom. Res.* 1935. Dec. Vol. 26. Pt. 4. pp. 543–551. With 2 text figs. & 2 figs. on 1 plate.

Davies (W. Maldwyn). **A Water-Power Mechanical Insect Trap.**—*Ibid.* pp. 553–557. With 3 text figs. & 2 figs. on 1 plate.

These papers describe mechanical devices which cause large funnel-shaped nets to sweep through the air. The propulsion is by electricity or water, and the methods of construction are illustrated. With either apparatus large numbers of small flying insects may be collected, and a study may be made of those which are in flight during particular periods of the day or night. The work is mentioned here because of its potential value to those who wish to sample populations of flying insects, for instance mosquitoes.

P. A. Buxton.

Zumpt (F.). Beobachtungen ueber Mückenbrutplätze in der Tikoebene (Kamerun).—*Arch. f. Schiffs- u. Trop.-Hyg.* 1936. Mar. Vol. 40. No. 3. pp. 115–118.

Bishopp (F. C.). Ticks and the Rôle they play in the Transmission of Diseases.—*Smithsonian Rep.* 1933. Publication 3276. pp. 389–406. With 9 plates & 1 fig. (map).

Buxton (P. A.). **Studies on Populations of Headlice.** (*Pediculus humanus capitis*: *Anoplura*). I.—*Parasitology.* 1936. Jan. Vol. 28. No. 1. pp. 92–97.

The number of headlice in crops of hair from individual people in London and Lagos has been estimated by a new method.

The method consists of obtaining a standard crop of hair (from army recruits admitted into the Woolwich Depôt and from post-mortem subjects in Lagos, West Africa), dissolving it completely in a solution of 50 gm. potassium hydroxide and 100 gm. sodium sulphide in 1 litre of tap water, filtering out the lice with a funnel of stainless steel gauze, sixty meshes to the linear inch, and counting the louse population. No lice were found in 235 specimens from Woolwich recruits collected in all months of the year. Twenty per cent. of the specimens from Lagos contained lice, the number of lice ranging from 1 to 1,286. Lice were more prevalent on the females—due probably to their rather permanent head-dressing. There was no significant difference between the different races of Africans in Lagos, nor at different seasons. This last result was expected, because the climatic conditions are so equable. Data from other parts of the world will be published later.

V. B. Wigglesworth.

LANCET. 1936. Feb. 8. pp. 330–331. **The Tropical House. An Object-Lesson at Liverpool.** [Summary appears also in *Bulletin of Hygiene.*]

Professor BLACKLOCK in a Chadwick lecture last year indicated many diseases traceable to housing defects—inadequate lighting, ventilation, draughts, damp, etc.—but in the tropics the dangers are greater because of the facilities afforded to breeding of insect vectors of specific disease. Three years ago these points were brought out in more detail by Professor BLACKLOCK in his book on *The House and Village in the Tropics* (see this *Bulletin*, 1933, Vol. 30, p. 59) and now the matter will receive still greater attention, for the Liverpool School of Tropical Medicine has rented land on which to build small replicas of houses used in different parts of the tropics, to illustrate the conditions associated therewith which may lead to the production or spread of disease. Here, students going to Liverpool to study tropical medicine and hygiene, persons, medical and lay, purposing to go to the tropics to live, may see the dangers and risks to which they may be subjected from faulty house-construction and learn how to avoid or combat them.

H. H. S.

WALKER (F.) & DIXON (D. Strangeways). **The Bug-Proof Construction of Native Dwellings.**—*East African Med. Jl.* 1936. Feb. Vol. 12. No. 11. pp. 344–347. With 2 figs.

A paper of practical importance in the tropics generally and for those responsible for the housing of natives in particular. The authors had in view the designing and construction of buildings having a minimum of suitable breeding sites for bugs, *i.e.*, elimination, as far as possible, of cracks and crevices. For *doors* and *door-frames* the usual design is unsuitable because of space being left between the frame and the wall. If this space is enlarged it ceases to harbour bugs ; this is accomplished by dispensing altogether with door frames and swinging the door on vertical pins about 1½ inches from the normal hinge. When open, the door is ½ inch from the doorway and when closed it completely fills the doorway.

For the *bunk system of beds*, lower bed boards are supported on dwarf walls bonded into the main walls, which are plastered and corners rounded. Upper bed boards are supported on angle irons bolted to the main walls, the beds are made of three boards of 10 by $1\frac{1}{2}$ inch timber not bolted, but laid on the angle or dwarf wall supports. For *roofs* the usually employed wall plates are not necessary and the space between them and the wall is a favoured breeding site for bugs. If they are not used the tops of the walls can be rounded and plastered. If roof-trusses are necessary they should not run up to the gable ends close to the walls; if they are not used, the purlins, instead of resting on the partition walls (as is customary), should be carried on short pieces of angle iron bolted to the walls, being thus some 3 inches above the walls and allowing the walls to be rounded off. In *plastering*, all corners should be smooth and rounded off; as a rule when both sides of a wall are plastered the plaster is pushed above the level of the top of the wall, leaving a cavity which harbours bugs innumerable. The figures in the article demonstrate the points referred to. *H. H. S.*

REVIEWS AND NOTICES.

BURKE-GAFFNEY (H. J. O'D.) [B.A., M.D., B.Ch., B.A.O. (Dub.), Senior Pathologist, Tanganyika Territory]. **An Outline of Clinical Pathology for African Medical Assistants.**—124 pp. With 11 coloured plates & 5 charts. 1936. Dar-es-Salaam: Govt. Printer.

Dr. Burke-Gaffney has published in book form his course of lectures delivered to East African Hospital Assistants undergoing training. With the material at his disposal, with the type of student whom it is his duty to instruct, this course must have been difficult to plan and still more difficult to carry out, because the author would be called upon to steer an even course between the Scylla of too much specialism and the Charybdis of insufficient information, and to accomplish this demands wide knowledge of the subject and the pupil, together with a high degree of selective acumen. The work must essentially be practical and at each stage of the teaching the application of the investigation made to clinical medicine must be brought home to the student, so that he may be impressed from the first with the fact that pathology is not, for him at least, a subject divorced from practical clinical medicine.

Dr. Burke-Gaffney is to be congratulated on the success with which he has accomplished the task he set out to perform. He leads the student by the natural path of biological principles and the essentials of medical zoology to the elements of clinical pathology, explaining the use of and care for the microscope. He then, to use a term beloved of politicians, explores the various avenues revealed and studies in turn the blood in health and disease, the faeces, modes of examination and information obtainable thereby, the urine, pus, exudations, effusions and transudations, the respiratory tract and its secretions, the skin and mucous surfaces, bacteria, and so leads on to a brief but adequate account of the principles of immunity. A very useful general chapter is that on Laboratory Routine which includes equipment, modes of collecting and preserving specimens and so forth. In appendices are indicated the nature of examinations likely to afford the most useful information in the conditions present to which the hospital assistant will often have recourse. The composition of stock solutions will save his having to turn to larger manuals and the formulae for dilution and for converting a stronger into a weaker solution of known strength are of great value and will save much waste of material. Sketches of the more important technical procedures—red and white blood cell counts, Widal tests, etc.—are given, and finally a glossary of some of the more important terms in general use.

One or two small points may be mentioned, as hints for future editions which will doubtless be called for. Polymorphonuclear leucocytes are termed polymorphs, *tout court*, all through the book, though the word is not mentioned in glossary or index to explain it, and on p. 61 we have "polymorph pus." On p. 35, schizogony would be better than sporulation, and in fact 5 lines after the latter is used the former is given but not explained; the organism of relapsing fever is a spirochaete not a spirillum (p. 38); faeces is a plural noun (p. 44); μ is not defined till we come to p. 119 and it is not mentioned in the glossary though repeatedly used in the text from p. 26 onwards. *Taenia solium* (p. 50) has a double circle of hooklets, Hymenolepis

only one. When speaking of sputum, "nummular" is mentioned but not defined nor given in the glossary. The term cyst is defined as "a stage in the life history of certain protozoa" (in the glossary), though it will often be met with in other senses by the hospital assistant, *e.g.* hydatid, ovarian, sebaceous, dermoid and so on. Some of the illustrations might be improved, *e.g.* that of ancylostoma (plate 6) and leprosy (plate 10). As stated these are small blemishes in an excellent and painstaking work. The book is handy, convenient and well printed, and those for whom it has been produced will find it invaluable, not only in their training but for keeping by them for frequent reference. *H. H. S.*

i. Chopra (R. N.) [C.I.E., K.H.P., M.D. (Cantab), M.R.C.P. (Lond.), Brevet-Colonel, I.M.S., etc.]. **A Handbook of Tropical Therapeutics.**—pp. xxi+1748. 1936. Calcutta: Art Press, 20 British Indian Street. [Rs. 25.]

ii. Calcutta: School of Tropical Medicine & Carmichael Hospital for Tropical Diseases. **Pharmacopoeia and Guide.** pp. xi+153. 1936. Calcutta: Art Press. [Rs. 2/8/-.]

i. The author of this book, who has already contributed much to the elucidation of many problems in the therapy of tropical diseases, is the Director and Professor of pharmacology and therapeutics at the Calcutta School of Tropical Medicine; in this work he gives a very complete account of the present-day treatment of these diseases. The book is very well written, and, in spite of its great length, it will be read with much interest almost from cover to cover. The title is rather misleading; much more is included that one is accustomed to find in a work on medical treatment, and its scope is not restricted to the tropics.

The book begins with an account of the general principles of the action of drugs and other therapeutic measures, the different methods of administration of remedies, diet, physical methods of treatment, and so on; it includes a very detailed and practical account of blood transfusion, and an interesting description and criticism of the dietary of Indians. The next four sections of the book are concerned with the treatment of helminthic infections, diseases caused by protozoa, bacterial and virus diseases, nutritional and miscellaneous diseases of the tropics; in part VI diseases of the skin are dealt with. Then follows a section of nearly 300 pages, which is described as a dictionary of diagnosis and treatment of more or less cosmopolitan diseases. The book ends with two long appendices, containing a large amount of useful information, some of which, however, appears rather incongruously in this setting.

Probably most readers of a new book on any branch of tropical medicine will turn first of all to the subject of malaria. Dr. Chopra's account of the treatment of this disease is among the best that have appeared so far, and it bears unmistakable evidence of his own experience and critical power of judgment. Quinine and the other alkaloids of cinchona bark are well discussed, and the author's studies of the action of plasmoquin and atebrin mark a distinct advance in the knowledge of the action of these drugs. The treatment of amoebic dysentery, cholera, plague, leprosy and beriberi is described at some length and with much information of practical importance. There is a full account

of anthelmintics, their respective merits and the modes of administration of them ; and an interesting discussion of the action of salts of antimony in the treatment of kala azar, a subject to which the author has made notable contributions. There is a well-balanced section on vitamins, with a caution against the indiscriminate and excessive use of proprietary preparations of these substances. The treatment of nearly all the other diseases of the tropics is adequately, and in some cases almost exhaustively, described. At the end of the book some prescriptions are given, taken from the pharmacopoeia of the Calcutta School of Tropical Medicine, and a short account of some new and non-official drugs and preparations.

Colonel Chopra states in his preface that his book is intended to serve as a work of reference for practitioners, and to serve the requirements of senior students ; there can be no doubt that it achieves both these objects. The book is such a good one that it can be recommended with confidence ; there must be few medical men who can read it without profit.

A " Handbook " of 1,750 pages ! It is well printed and strongly bound, but it is so heavy and so thick that it is very inconvenient to handle and read ; in a future edition it would be better if it were issued in two volumes.

ii. A small book of prescriptions in use at the Carmichael Hospital, Calcutta, with brief directions for the treatment of tropical and other diseases, for blood examination, administration of test meals and other clinical procedures. A considerable proportion of the information given is included also in the Appendix of the larger work reviewed above. *H. J. Walton.*

CALCUTTA. **Annual Report of the Calcutta School of Tropical Medicine and the Carmichael Hospital for Tropical Diseases 1935** [CHOPRA (R. N.), Director].—191 pp. With 2 figs., 6 graphs & 2 plates. 1936. Alipore : Bengal Govt. Press.

The main objects for which the Calcutta School of Tropical Medicine was established are post-graduate teaching and research in tropical diseases. Most of its professors have been allotted beds in the Carmichael Hospital for Tropical Diseases, so that they are able to bring into practical application in treatment the results of their researches. The Annual Report for 1935 deals with the School's activities both as a post-graduate teaching centre and as a research organization. During the year investigations have been made on epidemic dropsy, cerebrospinal meningitis, hill diarrhoea, malaria, drug addiction, indigenous drugs, kala azar, hookworm, leprosy, bowel diseases, diabetes, filariasis, and other problems. Details of much of the work referred to have been given in papers and memoirs by members of the staff of the School published in the *Indian Journal of Medical Research* and the *Indian Medical Gazette* during 1935, and noticed in this *Bulletin* in the appropriate sections. These papers and memoirs have been bound up in reprint form, and are issued with the Annual Report as Appendix A containing 19 papers from *Indian Journal of Medical Research* and Appendix B containing 30 papers from the *Indian Medical Gazette.* *R. L. S.*

Neveu-Lemaire (M.) [Professeur Agrégé, Chef des Travaux de Parasitologie à la Faculté de Médecine de Paris]. **Traité d'Helminthologie Médicale et Vétérinaire.** [Treatise on Medical and Veterinary Helminthology.]—pp. xxiii + 1514. With 787 figs. 1936. Paris: Vigot Frères, 23 rue de l'Ecole-de-Médecine. [175 francs.]

The purpose, a difficult one, of the author is to get into one book an account of the biology, systematic position and ill effects on their hosts, definitive and intermediate, of the helminths of man and of domestic animals. Part I, General Helminthology, goes into the many aspects of the question in 70 pages. Part II, Special Helminthology, covers the systematic zoology of helminths (with many and good illustrations and a number of useful keys for the recognition of genera and species) and some consideration of disease which may be caused by the worms—a most useful compilation of nearly 1,300 pages. Part III, of 40 pages, gives a check list of helminths which make use of each particular animal as a definitive host; and Part IV of 70 pages does the same for animals which are intermediate hosts, with illustrations of a number of them. A short bibliography and an index complete a book of systematic value which will soon need rebinding if it has much use. *Clayton Lane.*

Reis (J.) & Nobrega (P.) with the collaboration of A. S. Reis. **Doenças das aves (tratado de ornithopathologia). Secção de ornithopathologia do Instituto Biologico.** [Treatise on the Diseases of Birds.]—468 pp. With 359 figs. & 4 coloured plates. 1936. Sao Paulo.

Some four years ago the authors issued a work on the diseases of birds, directed to assist those engaged in breeding of birds and in aviculture generally, and consequently of a popular rather than of a strictly scientific character. The present treatise is not merely an amplification of the older work; it is an entirely new undertaking on scientific lines, and one which is greatly needed. Each chapter is as complete as the experience of the authors and a wide search of the literature have been able to make it. Articles on the matters dealt with are published in many languages, often buried in less well-known journals and difficult to come by, hence the greater credit to the authors for having succeeded so well.

The work is divided into sections, each subdivided for purposes of description. The first deals with virus diseases, the second with bacterial, and then in order the eumycetic conditions, protozoal, helminthic and nutritional, with interspersed chapters on parasitic arthropods, and pathological anatomy and histology. Not only is each section, but each chapter, a mine of information. There are four coloured plates and over 300 illustrations in the text. Each chapter is well documented and there is a full and carefully prepared index. Further, not only is the condition in the bird described but interesting points are brought out of great interest to comparative pathology. In short, the work is indispensable to research workers engaged in veterinary or comparative pathology, and will be invaluable to pathologists at Zoological Gardens. It would have been a veritable godsend to the reviewer when he held the post of pathologist to the Zoological Society of London. The fact that it is in the Portuguese language should not

deter those little acquainted with that tongue from getting and studying the book. The text is easy to read and the illustrations abundant and clear. We hope the authors will find sufficient encouragement from its reception to arrange for translation. [The price is not stated.] *H. H. S.*

BARNARD (Cyril C.) [B.A. (Lond.), Univ. Dipl. in Librarianship, F.L.A., Librarian, London School of Hygiene & Tropical Medicine, etc.]. **A Classification for Medical Libraries, with Introduction, Local List, Index of Parasites and General Index. Being a Thesis approved for the Diploma with Honours of the Library Association (1931).**— 142 pp. 1936. London: Percy Lund, Humphries & Co., Ltd., 12 Bedford Square, W.C.1. [10*s.* 6*d.*] [Review appears also in *Bulletin of Hygiene.*]

The purpose of any library classification is to provide a plan for the orderly arrangement of the books. An ideal plan would bring together in one place all the publications on a particular subject, where they would be neighboured by publications on closely related subjects, thus providing, by a logical sequence of arrangement, a ready means of ascertaining the scope and nature of the literature relevant to any topic of enquiry. This ideal may be unattainable, for a difficulty common to all systems of library classification is that authors rarely confine themselves to one subject in one book and yet a book can have but one place on the shelves. Mr. Barnard's scheme of classification does, however, come as near as possible to being a perfect one for medical libraries. Its underlying principle is that of specific entry, *i.e.*, one place for each topic under which are grouped all its aspects. In this it greatly improves on older systems such as Dewey's and the Brussels Universal Decimal Classification which, for medicine at least, tend to disperse rather than gather together the literature of a subject by introducing such subdivisions as anatomy, physiology, pathology, surgery, etc., and distributing books under these various heads. Dewey and the Brussels classification are based on theoretical conceptions accepted fifty or more years ago but now out of date. Mr. Barnard's system of classification on the other hand is the result of twenty-one years of practical experience in four medical libraries of very different type, and is in actual use in the library of which he has charge at the London School of Hygiene and Tropical Medicine. Besides the synopsis and main schedules of the scheme the volume contains a full explanatory introduction, local list, index of parasites, and general index, so that by their aid users can quickly assign books and pamphlets to their appropriate places in the classification. As a "Classification for Medical Libraries" Mr. Barnard's book is both practical and thorough, and full of possibilities of usefulness to anyone wishing to arrange and classify a collection of medical publications either large or small. *R. L. S.*

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